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THE attitude which has been assumed by the engine and trainmen's organizations of the Southern Pacific with reference to the operation of trains on the company's electrified lines, will, if maintained, seriously retard the further electrification of branch lines, which has received much consideration, especially in the West. While the present controversy relates only to Southern Pacific lines, it is generally regarded as presenting a test case, which, if won by the unions, will affect conditions of employment on other roads. The Southern Pacific substituted electric for steam power on its suburban lines in the vicinity of Oakland, Cal., two years ago. It also recently organized the Portland, Eugene & Eastern to take over and electrify its branch lines from Portland, Oregon, south to Eugene, and a portion of this system is now practically ready for electric operation. The Pacific Electric system in southern California, which is also a Southern Pacific property, is not involved in the present controversy, as it is operated separately. The most important demands of the employees are that seniority rights in steam service on all lines of the coast system, including the territory from El Paso to Portland, be extended over the electrified lines, and that the rates of pay in steam service be applied on the electric system. A strike vote has been taken, and representatives of the roads and of the men have been in conference in San Francisco for two or three weeks. The extension of seniority rights over the electric lines, as demanded, would mean that any locomotive engineer, for instance, could claim an electric run without any previous training for the special duties of a motorman. The demands for equality in pay ignore the fact that the qualifications and experience necessary for motormen on electric trains are much less than for locomotive engineers, and also that conditions such as heavy tonnage, which have made possible and necessary previous increases in the wages of men in steam railway service, do not exist in electric service. The duties of trainmen on the Southern Pacific electric lines are essentially the same as those on high-class interurban lines, and the wages paid compare favorably with those ordinarily paid in such service. To raise the wages of employees on these electric lines to the same basis as those on steam lines would undoubtedly be the first step toward forcing up wages on all electric lines. One of the important economies attained by electric lines has resulted from the lower wages they have paid train and enginemen, and to eliminate this economy, as the labor organizations are trying to do, would seriously affect further developments along the line of electrification.

AT the Master Blacksmiths' Association convention at Richmond, Va., last week a report was presented by the committee which was appointed to confer with the Master Mechanics' Association with a view to obtaining the co-operation of the latter body in increasing the attendance of the smith shop foremen at the Blacksmiths' convention. During the presentation of the report, the chairman of the committee read an editorial on this subject which appeared in the *Daily Railway Age Gazette*, June 18, 1913. Aside from the value of the papers read and the discussion engaged in, anyone who attends one of these conventions can scarcely help being impressed with the manner in which those attending the convention grasp the opportunities for the exchange of methods and ideas, whether in the meetings or outside. There are numerous cases where men have obtained at these conventions ideas which, when put into practice on their return home, have saved their companies considerable money. Some railroad companies gladly send their foremen to the conventions and pay their expenses while there, and it is quite probable that in many cases, aside from the broadening effects that such meetings are bound to produce, the direct savings possible through the interchange of ideas will much more than offset the expenditure incurred in sending them. There is, however, a side to this question which the members, not only of the Master Blacksmiths' Association, but of all the smaller associations, should not overlook, and that is the fact that there are at least ten such associations allied to the mechanical department alone. These each have memberships ranging from 150 to 1,000, all of whom should have their expenses paid if it is allowed in any one case. Taking the standpoint of the higher railroad officer it can be readily seen that there must be a limit and this is unquestionably the explanation, in a number of cases, for the disinclination to pay expenses to any convention. Undoubtedly the railroads should for their own benefit encourage attendance at these conventions, but considering the number of such associations and the extent of their membership, can it not be considered sufficient encouragement if the members are allowed the time at the conventions with full pay and their transportation?

THERE is hardly another railway association in the country whose development is better entitled to encouragement from the higher officers of the railways than the American Association of Railroad Superintendents, which held its annual meeting in Chicago last week. There are many organizations of railway officials, and doubtless the executive officers sometimes grow impatient because of the amount of time that their subordinates take in attending conventions. But probably nobody who is familiar with the facts would seriously question that the work of such organizations as the American Railway Engineering Association, the Master Mechanics' and Master Car Builders' Associations, the Railway Signal Association, the Association of Transportation and Car Accounting Officers, and the Train Despatchers' Association have contributed much toward increasing the efficiency of railway operation. Now there is no strong organization corresponding to these in the distinctively transportation field, in other words, no strong organization which devotes itself to the detailed study of the numerous questions pertaining to the movement of cars and trains. The American Railway Association is a supreme court of appeal on all operating matters rather than a body which devotes itself to dealing in detail with the technique of car and train movement. A great deal of study has been given for years to the efficient construction and maintenance of track, structures and equipment. There has been no comparable study of methods for increasing the safety and efficiency with which track, structures and equipment are operated. Probably it is largely due to this that two of the greatest problems now confronting the railway managements of America are those of reducing accidents and getting a ton mileage per day and per year out of locomotives and cars proportionate to their tractive power and capacity. In order that equipment and structures may be not only efficiently developed and maintained, but also efficiently worked, it is essential that methods for getting them satisfactorily loaded and satisfactorily moved shall be studied, developed and refined with the same laboriousness, perseverance and thoroughness as the various features of construction and maintenance. It would seem that an organization composed of general superintendents, superintendents, trainmasters and yardmasters could do the needful work much better than an organization such as the American Railway Association, composed chiefly of executive officials, could possibly do it. The American Association of Railroad Superintendents is now composed of railway officers of most of these classes, but it needs encouragement and support from the higher officers in order to enable it to live up to its possibilities. The engineering and mechanical officers are chiefly staff officers. Those concerned with car and train handling are line officers. American railways will be more efficiently operated when there is as much scientific study devoted to the work of the line as there is given to the work of the staff. The best ways in which to strengthen the American Association of Railroad Superintendents would be for the general managers to instruct their superintendents to attend and participate in its meetings.

WHILE the Association of Railroad Superintendents deserves encouragement, it was very unfortunate in the selection of one of its speakers. W. W. Wheatly, who evidently considers himself an authority on railway economics, delivered an address in which he repeated every stale slander on the management of American railroads and drew every false inference from their statistics with which the muckrakers have regaled the country during the last ten years. Mr. Wheatly sought to show, among other things, that the increases in the expenses of the railways have not been due chiefly to the increases in wages, but to increases in what the roads have paid for supplies and equipment. These increases in the costs of supplies and equipment he attributed to improper financial relations between the railways and the large trusts and banking interests. Now, it is true that there have been heavy increases in the cost of materials and supplies. It is also true that there have been and are dubious relations between some railway systems and some large industrial and banking concerns. But it is absurd to attribute the greater part of the total increase in railway expenses to this cause. The increase in the other expenses of railways has not been anywhere near as great, either absolutely or in proportion, as the increase in the wages paid by them. The following table containing statistics of the Interstate Commerce Commission for 1902 and 1912 demolishes Mr. Wheatly's theory:

	1902.	1912. (Railways earning over $100,000 gross)	Increase.	Per Cent. Inc.
Total operating revenues	$1,726,380,267	$2,826,917,967	$1,100,537,700	64.6
Total operating expenses	1,116,248,747	1,958,963,431	842,714,684	75.5
Total compensation of employees	672,028,592	1,243,113,172	571,084,580	84.9
Total other expenses	444,220,155	715,850,259	271,630,104	61.1
Ratio of compensation of employees to total earnings, per cent.	38.9	43.9		
Ratio of compensation of employees to total expenses, per cent.	62.4	63.4		

It will be seen that expenses aside from compensation of employees, which include all expenditures for equipment, supplies, etc., increased during this ten years only 61 per cent., while the total compensation of employees increased almost 85 per cent. The increase in the compensation of employees added $571,000,000 to railway expenses; the increase in other expenses added only $271,000,000, or less than half as much. The consequence was that in 1902 the compensation of employees was only 62.4 per cent. of total operating expenses, while in 1912 it was 63.4 per cent. of total operating expenses. The increase in other operating expenses was less in proportion than the increase either in total wages, total expenses or total operating revenues. Mr. Wheatly also went on to repeat the stock charges of the demogogue and the muckraker that the capitalization of railways has been increasing inordinately, and that this, together with the inflation of operating expenses that he alleged has been occurring, has been increasing the cost of living. Increases in railway expenses and capitalization could not increase the cost of living unless they caused increases in the rates that had to be paid by travelers and shippers. Now, the average rate per passenger mile in the United States in 1902 was 1.986 cents, and in 1912 it was 1.985 cents; and in 1902 the average rate per ton mile was .753 cent, and in 1912, .743 cent. In other words, both passenger rates and freight rates were lower at the end of the decade than they were at its beginning. Just how, when rates remained stationary or declined, railway financing and operation can have increased the cost of living, we leave Mr. Wheatly to explain.

SILENT Signals Spell Sound Sleep. This is the introduction to an advertisement of the Chicago & Eastern Illinois in which the line of that road between Chicago and St. Louis is characterized as "The Noiseless Route." "No shouts and yells of trainmen" will disturb the sleep of passengers on the night express. Employees are "sworn to silence." This advertisement is warmly to be commended. Unless the C. & E. I. is better than most roads the rule will be broken a good many times, and the advertising manager will receive complaints and will have to complain to the superintendent that the preaching and the practice are not being made to correspond; but it is good, nevertheless, to set a high standard, and to let it be known to the public. The ideal having been published in the newspapers, all hands will have a stronger incentive to live up to it. And the high degree of noiselessness already attained on our best roads is only an added reason for making the requirements still more strict; passengers make so many all-night journeys with no disturbance whatever that a single occasional

offense becomes a notable annoyance. Without putting the slightest emphasis on the name of the Chicago & Eastern Illinois, or of any other one road, we would suggest that the trainmen and switchmen are not the only offenders. Various other night noises frequently annoy the sleeping-car sleeper. The train advertised by the C. & E. I., like others on many roads, starts out at midnight. Many passengers find it convenient to board such trains at 11 o'clock, or earlier; and in summer they thus lie by an open window in the station for an hour, and may wish to sleep. Among the things which in such circumstances prevent sleep are the pop valves of waiting locomotives, and the noisy trucks of the men loading express matter, mail bags and baggage. The fact is that in undertaking to make a big station quiet, even in the night, the railroad manager makes a big contract, and a good many different people have got to be "jacked up" now and then. Not unnaturally, the switching crews in the freight yard—who often bang the cars so that the noise penetrates the ears of passengers many rods distant—look upon the demands of the sleeping passengers as pretty stiff, and as based on refinements that working men cannot sympathize with; nevertheless, passengers have acquired the habit of expecting quiet; in the great majority of cases it is easy to accommodate them, and therefore there is nothing to do but strive for perfection. And in abating nuisances the superintendent or trainmaster can do good work with sights and smells, as well as noises. Often a passenger in a berth has some little trouble in adjusting the curtains so as to avoid annoyance from a powerful electric light. Barrels of fish on a baggage truck, under the car window, sometimes make a passenger wish that he had gone by another road. If the waiting sleeper is set on a track out in the yard, to avoid the noises in the shed, offensive odors from adjoining buildings, swamps or gutters sometimes intrude. Live stock trains are sometimes stopped alongside of passenger trains needlessly. The officer who sets out to straighten all unpleasant things of this kind may be tempted to think that he is wasting his time on excessive refinement; but "trifles make perfection."

THE state of Pennsylvania has put itself in the rapidly growing list of states having a "strong" railroad commission. The former commission of three members, possessing few and comparatively mild powers, is metamorphosed into one of seven members with ten-thousand-dollar salaries and ten-year terms. The new law, briefly noticed in our issue of August 8, page 238, is abstracted on another page of this number. Large salaries do not insure competent commissioners—as has been evident in New York since weak governors have taken the place of Governor Hughes—but Governor Tener of Pennsylvania has made a beginning which seems to be regarded in that state as highly commendable. From the standpoint of the science of railroading, as well as of true public spirit, he could not have done better than he did in selecting Prof. Emory R. Johnson; and in appointing a banker, an experienced street railroad operating officer, a former state treasurer and a former governor, he showed exceptional appreciation of the importance of the commissionerships. Those parts of the new law which impose new burdens and enlarge and stiffen the regulative powers of the commission do not go into effect until next January, the duty of the commission for the next four months being mainly to finish up the business of the former railroad commission. This law will be notable not so much because of its general character—which is much like that of the law of New York, which has been in force now for six years, interpreted by the strong, intelligent and public spirited Stevens commission—as from its detailed phraseology and from its existence in a state which has an enormous railroad traffic yet never before has subjected the railroads to much regulation. In phraseology and arrangement this law appears to be an original work—it is said to have been drawn mostly by Dean Lewis of the University of Pennsylvania Law School—and it is unusually clear and easy to read, though it is very long. Not improbably in the course of years it will clarify many points for the courts and for the commissions of other states. The establishment of a commission of strong men in a state like Pennsylvania is, indeed, an event big with possibilities. The Pennsylvania Railroad is in many respects the greatest railroad institution in the world, and the Pittsburgh district has what is probably the densest freight traffic in the world, considering the extent of the territory. The Reading is also a great institution and the rates for the transportation of anthracite coal are of interest to fifty millions of people. Governor Tener has only partially got away from the vicious idea that a state regulator of railroads must know nothing about the railroad business; so there is no danger of revolutionary action by the commission. This point, by the way, is one that will have to be taken up and settled sometime. Knowledge of railroading is absolutely essential; shall commissioners acquire it by slow study; or shall they hire it? Or are we to go forever on the assumption that railroad experts possessing patriotism and public spirit cannot be found? There seems to be only one railroad expert on this commission—Prof. Johnson—for the electric railroad manager has been selected, no doubt, with a view to having him give his time wholly to interurban and street railroad matters. Commissions which deal with all kinds of public service are in danger of being classed as jacks at all trades, and masters of none.

THE CAUSES OF AND REMEDIES FOR CAR SHORTAGES.

LAST year and again this year the railways have issued warnings to shippers and consignees that shortages of freight cars were impending. The warnings have been accompanied by appeals for the shipping public to co-operate with the roads in efforts to restrict the shortages and their harmful effects to the practicable minimum. The railways in issuing these warnings and appeals have rendered a courtesy and a service to their patrons. Their patrons have everything to gain and nothing to lose by extending the co-operation for which the roads ask. Some of our esteemed contemporaries, including the Chicago *Examiner* (August 3, 1913) and the Buffalo *Times* (August 21, 1913) have grown editorially cynical about the warnings issued by the railways. They have also fallen into serious errors in their statements of fact regarding the car situation. They have implied that deficiencies of rolling stock have become of annual occurrence; and the Buffalo *Times* has even been so far misled as to conclude a lucubration with the remark, "the shipping and receiving public will welcome with keen enthusiasm the appearance on the stage of that hitherto unfamiliar artist Car Surplus.

The implication that car shortages have been occurring in the United States every year is incorrect. There were shortages in 1907, 1909, and 1912, but there was none in 1908, 1910 or 1911. Furthermore, contrary to the Buffalo *Times*, the great artist "Car Surplus" has been appearing on the stage in recent years much more frequently and staying for much longer periods than has "Car Shortage." The American Railway Association between January 2, 1907, and July 15, 1913, made 162 fortnightly reports on the car situation, and 139 of these showed net car surpluses. In other words, "Car Surplus" made six times as many appearances as "Car Shortage." Furthermore, the net surpluses have been very much larger than the net shortages. Only twice in six and one-half years have shortages exceeding 100,000 cars been reported, while surpluses varying from 100,000 to over 400,000 cars have been reported 76 times; and surpluses exceeding 200,000 cars have been reported 36 times.

The amount of freight traffic delivered to the railways fluctuates violently in different parts of the year; and this is the main explanation of car shortages. The largest month's business in a given year often exceeds the smallest month's business by 50 per cent. The railways have their "rush months" of freight

traffic just as urban and suburban railway systems have their "rush hours" of passenger traffic. The "rush months" of the railways come in the fall and early winter. In order that the railways might handle their "rush months" traffic as expeditiously and satisfactorily as the traffic delivered to them in other months, it would be necessary for them to provide extensive additional facilities which would not be utilized a third of the time, and to hire a very large amount of additional labor. In order to make sure that they would have enough labor to handle the traffic expeditiously during the rush months it would be necessary for them to keep the additional labor on their pay-rolls twelve months in the year. It is because the roads do not now do this that they are always confronted with a shortage of enginemen, trainmen and other employees, as well as of physical facilities when the rush months of traffic come.

If the additional facilities and labor were provided the year around the fixed charges and operating expenses of the railways would be very heavily increased, and the public would have to pay these additional fixed charges and operating expenses in the form of higher rates. Clearly recognizing this fact, does the public desire the railways to provide the additional facilities and labor? It does not. It may say that it does, but if actions speak louder than words it does not. The railway managers of the country repeatedly, year after year, have told the public that with existing rates they could not provide sufficient facilities and labor to handle the rush months traffic expeditiously; and the public throughout this period has consistently refused to permit the railways to meet increasing expenses and fixed charges by higher rates. Our newspaper friends may continue to grow cynical and caustic if they like when railway men renew the cry of car shortage; but they can rest assured that, regardless of their comments, that cry will continue to be heard in the land with increasing frequency just as long as the present policy of chronically legislating to increase railway expenses and curtail railway earnings is persevered in. The job of making bricks without straw is still just as impossible as it ever was.

Fortunately, while the main remedy for car shortages is larger railway earnings in proportion to railway expenses, the condition can be partially remedied by a more efficient use of existing facilities. More thorough study and supervision of the handling of cars and trains will reduce the delays to cars while they are in the hands of the railways. Better co-operation between the railways and their patrons in order to reduce the delays to cars while shippers and consignees have them for loading and unloading will further ameliorate the situation. The railway managements should do all that they can to increase the efficiency with which locomotives and cars are used. The patrons of the railways should likewise do their part; and when newspaper writers criticise the railway managements for calling the attention of shippers to the situation and asking for their co-operation they show that they are either unfair, or ignorant of the conditions to be dealt with.

It often seems to be assumed that car shortages are peculiar to the United States. Some people advocate the development of inland waterways as a remedy for them; others, government ownership of railways. It is a salient fact that in Germany, where the development of inland waterways and government acquisition of railways have been carried out more consistently and thoroughly than in any other country, there are more complaints about shortages of freight cars than in any other country. The car shortage in the Ruhr district of Prussia rose in December, 1912, to 12,000 cars a day. This being 3 per cent. of the total freight cars in Prussia, it was equivalent to a shortage of 60,000 cars in the United States. Furthermore, it will be noted that this is only the shortage reported from a single industrial district of Prussia; and somewhat similar conditions existed throughout the country. Car shortages have been more numerous and larger in proportion and have lasted longer in Germany, with its state railways and its highly developed inland waterways, than in the United States; and the only remedies for them there, in the United States or elsewhere, are, first, to provide the means for developing railway facilities in a reasonable ratio to the development of freight traffic; and, secondly, for both shippers and railways to so use the facilities available as to enable the largest practicable ton mileage to be moved with them.

GRADE CROSSINGS AND AUTOMOBILES.

THE question of safety at highway grade crossings is always present with every railroad manager, and since the advent of the automobile it is more intense than ever; and one of the worst afflicted roads is the Long Island, because of its peculiar situation. Its territory is level, and the building of mushroom railways was in former years as much of a craze there as on any western prairie; and those roads, some of them unnecessary, are now parts of the Long Island in good and regular standing, but with hundreds of level crossings. The territory is close to New York City and now largely within the city limits, and is very thickly populated. Automobiles by the hundreds are flying everywhere at all hours of the day and night. There have been many fatal accidents, followed by much public discussion. The Long Island road spends a large percentage of its earnings for crossing watchmen—at one time it was 5 per cent. of the gross receipts—and yet the unwatched crossings are numerous.

As to the general question of gates, flagmen and bells, and the problem of separating grades, our readers are well-informed, and we bring up this crossing question at this time, not to go over that familiar ground, but to discuss briefly that aspect of the case produced by the advent of the automobile; and we quote below a letter, abridged, recently sent to the *New York Times* by a committee of the City Club. This club is composed of some of New York's most public spirited citizens, and its utterances deserve consideration. The letter makes large demands, but it is evidently the product of one who is thoughtful and who believes that he is entirely reasonable. The letter says:

> In their anxiety to escape all blame for the fatal automobile accident of Sunday the officials of the Long Island Railroad Company show that they still fail to recognize the new responsibilities which the automobile has placed upon them at grade crossings. It is not fair to place all the blame on the drivers. New conditions have arisen which it is up to the railroad to meet.
>
> In the days of horse-drawn vehicles the fixed signs at country grade crossings were generally sufficient; the majority of persons were familiar with the locality, and whistles and bells could be heard in sufficient time. Present-day conditions are very different. The automobile is here, with its faster speed, requiring more distance in which to stop. . . . . Again, automobilists do not confine their riding to one limited district, and cannot be expected to be familiar with the exact location of every crossing. . . . . While some persons undoubtedly cross railroad tracks knowingly at unsafe speeds, it is unreasonable to expect thousands of drivers to run at a horse's pace on account of the possibility of coming unexpectedly upon a grade crossing. If railroads run their trains at full speed across highways it is only fair that they should give adequate warning and to change the warning to meet changed conditions.
>
> The railroad companies alone can warn the motor car driver, and they must adopt a way to do it which will give a car sufficient time and distance in which to stop. The whistle is a noise to be given up. The Long Island should consider the use of searchlights, such as are commonly found on interurban electric cars.
>
> If reliance is to be placed on an electric crossing bell, then additional bells should be placed on each side of the crossing, at a sufficient distance to allow easy stopping, like a distant signal on a railroad. A flagman is no longer sufficient; nor are gates sufficient, unless they are very conspicuous from a distance by day and night.
>
> For the home signal at a crossing, a red sign with the word "Stop" would appear a good thing. For the distant signal, a yellow sign with the words "Slow down" might be enough. Gates might be painted with black and white stripes, like German signal posts.

The first thing that a railroad man notices about this letter is the calm assumption that the whole cost of any change should be borne by the railroads. So fully assured is the writer that that is the correct view that he does not even mention the possibility that a fair apportionment of the cost might throw a large share of it on the automobilist, or on the city. Possibly he

thinks that there would not be much expense. But any really effective arrangement which would permit people on the highway to approach railroads at 40 miles an hour, taking no care to look both ways for trains, would surely add materially to the cost of crossing maintenance. Railroads have not been able to avoid heavy cost in making such preparations at crossings of one railroad with another, and it is not likely that they can here; the highway is a good deal like a railroad when its users indulge in railroad speeds.

Indeed, the problem of letting fast moving vehicles cross one another's paths has always been one of the most troublesome that railroad men have to deal with; and this new problem is very much like the old one. One fundamental principle applies everywhere: the higher the speed the greater the expense and the care demanded. Except where money can be freely spent, speed must be severely limited. And an almost universal principle is that the newcomer who calls for a crossing must bear the whole, or a very large share, of the cost. A new railroad laying tracks across an old one cannot impose at will the cost of making or maintaining a crossing on the existing line. This is an accepted rule in railroad practice generally. Wherein is a new line of automobiles different, in this matter, from a new line of rail cars? The fact that a thousand automobiles are owned by a thousand different men does not alter the situation, so far as the railroad company is concerned. The only pretext for saddling the whole expense of this newly demanded safeguard on the railroad is the old one—might makes right. Cities and states have got into the habit of ordering the railroad to pay for everything but, logically, there is no reason why the automobile should not bear the whole of any additional expense or burden necessary to make crossings safe for them.

Concretely, the letter which we have quoted demands just one thing—distant signals on the highway. Powerful electric lights on trains would be in some degree useful, but we do not believe that this feature of the letter calls for serious attention. The general introduction of such lights would be costly, without providing a complete remedy. In some situations the light rays would not give a good warning; powerful lights are in some degree objectionable in themselves, as is often evident when one meets an automobile at night; and the absence or failure of a light would give a false sense of security. Every train not having a searchlight would have to reduce speed. The proposal for a distant signal on the highway is the only practical feature of the letter.

If automobiles are to be free everywhere to run at unlimited speeds distant signals are a necessity. Cities and towns may even find it necessary to erect distant warnings at curves in the highways, at narrow bridges and street corners. The intoxicated and the reckless chauffeur constitute the main difficulty; but a good deal of regulation has got to be administered to persons who class themselves as well-meaning, before our streets and roads will be reasonably safe. The railroads have no reason to consider themselves sinners above all the men that dwell in Jerusalem.

But the distant signal problem is not quite so simple as it seems. A target or sign fixed 500 ft. to 1000 ft. back from the tracks would be all right if it could be made surely visible at night; but visibility is a question of degree. Even in daylight a sign would have to be very big, very bright and very near the roadway not to be ignored by some drivers. Persons who have been struck by trains and subsequently have testified in court, frequently manifest the most astonishing blindness; and juries believe them. And, remembering the great range of country traversed by each automobile owner, uniformity in the design of these signs is an important desideratum; uniformity in size, color, location and wording. Uniform legislation in all the States might be found desirable and even necessary.

If automobile drivers would exercise even a moderate degree of caution, a distant signal would be valuable without artificial light at night. It could be made visible at night except in such thick darkness as would impel any reasonable driver to limit himself to low speed; but the public will demand all possible protection, and we may as well consider a lamp as an essential. This makes a caretaker necessary; and as the railroads everywhere bear the burden of watching crossings, if anybody watches them, this burden will fall on them. Attending to two lamps several hundred feet from the crossing is a matter quite different from caring for a single lamp at the crossing. Should the watchman leave his post to relight a lamp that had gone out? Assuming that lamps would fail no oftener than signal lamps, or than crossing bells, the danger from failure would be small, and the problem of care may perhaps not be so serious as we have assumed; but it is well to bear in mind that lamp failures introduce a peculiar danger. Railroad men know this, from experience with block signals, but other people usually ignore the point, and they should be informed. At crossings where there is no attendant the question of care is, of course, more troublesome; the introduction of distant signals would add materially to the cost, for the work of the inspector would be increased and lamps, except where electric lights were available, would have to be regularly lighted and cleaned.

A signal distant from the tracks is not an absolute necessity. Drivers could reasonably be required to take the responsibility of discerning the warning before reaching it, especially if an audible signal were also provided. This would be possible except in time of fog or snowstorms; and at such times high speed on the highway ought to be prohibited. Ingenious arrangements of moving signals, and electric light effects which simulate moving lights, are already in use to a limited extent.

And the limitation of speeds in fog serves as a reminder that limitation is not only possible, but reasonable, at all times. We have discussed the distant signal, because the demand for it is not entirely unreasonable; there are places, no doubt, where it would facilitate traffic without much increase of expense and without enhancement of danger. But why should not the automobilist, for his own benefit, and his own peace of mind, run slowly at all places except where he can see a clear road? To assume that there is no crossing (or other danger) unless he sees it is to act like a blind man. To run at high speed when he has the affirmative testimony of his own eyes, that the roadway for a long distance ahead is clear and unobstructed may be proper—if he is not infringing the rights of other automobiles—but in any other condition he has no reasonable right to run otherwise than under control. Only by the introduction of the block system, like the block system of the railroads, can such practice fairly be tolerated.

In view of the conditions touched upon, and of other considerations which the reader will call to mind, we are inclined therefore to look with a very friendly eye on the proposal for a positive speed reducer at crossings which was noticed in our issue of August 15, page 302. Making a sharp turn in the road will compel everybody to run at moderate speed. There would be no injustice in this. The railorads have to have arbitrary speed limits. In the absence of adequate interlocked signals all trains at crossings and junctions are required by very rigid rules to run at low speed, and usually to stop. The distant signal idea has merit, even with the speed limiting angle in the road; and it may be that we ought to have both. A distant signal can serve to warn all who wish to be warned; but there will still be the reckless drivers to be reckoned with.

It is proper to add a word concerning automatic signals—apparatus which produces sights or sounds by means of electrical impulses started and stopped by the passage of trains. When properly actuated these indicate the approach of a train; their silence or absence indicates that none is approaching. Automatic bells *at* crossings are common, and visual signals, controlled in the same way, are in use to a limited extent.

These bells and signs are highly useful in their field, but they should never be used at any considerable distance from a crossing, for the reason that when they give the wrong indication because of being out of order they introduce an element of danger. This danger is a feature to be reckoned with. With the signal at the crossings it is sufficiently small to be tolerable; the signals are valuable in spite of it; but at a point 500 ft. away, a signal indicating to the motorist "proceed" when it ought to indicate "stop," would be very definitely dangerous because he would feel warranted in putting on full speed. There are other reasons why a signal fixed at a distance from a crossing should never encourage a driver to increase his speed, but this one alone is controlling.

AMERICAN LOCOMOTIVE COMPANY.

THE annual report of the American Locomotive Company for the year ended June 30, 1913, shows that the earnings of that company increased in proportion to the very large increase in locomotive construction during that period compared with the previous year. In the calendar year 1912 the number of locomotives ordered was larger than in any other year since 1906 and until June, 1913, orders continued to come in at approximately the same rate. It is not surprising, therefore, that the gross revenue of the American Locomotive Company for the year, $54,868,175, including earnings from the manufacture of automobiles, was the largest of any year in the history of the company. It was $24,418,723 larger than in 1912; $5,350,000 larger than in 1907, the best previous year, and over twice as great as in 1902, the first year in the company's history. The interest earned on the common stock was 17.7 per cent. compared to 0.47 per cent. in 1912 and 18 per cent. in 1907. No dividends have been paid on the common stock since 1907. The company started the year under the most auspicious conditions, for on June 30, 1912, the contract work in course of construction amounted to $2,051,187, compared with $740,550 one year before; also the amount of unfilled orders on July 1, 1912, was $14,450,000, compared with $6,015,000 on the corresponding date of the previous year. Judging from present indications the earnings of the fiscal year 1914 will show a decrease from those of last year, for, although the contract work in course of construction on June 30, 1913, amounted to $3,975,022, and the amount of unfilled orders on the following day was $17,156,388, orders have shown a sharp falling off since last May, so much so that it is expected that there will be a reduction in the operations of the plants in the United States in the near future.

The manufacturing, maintenance and administrative expenses, including a charge of $1,226,535 for depreciation, were $48,041,691, an increase of $19,924,144 over 1912, during which the depreciation charge amounted to $1,021,382. The profit available for dividends was $6,185,305, which was exceeded only in 1907, when it amounted to $6,358,207; for the year 1912 the profit available for dividends was $2,331,904. In 1913, after the payment of the 7 per cent. preferred dividend, there was set aside $600,000 out of the remaining surplus of $4,435,305, to provide for current additions and betterments to the plants. In 1912 nothing was set aside for those purposes. On June 30, 1912, the reserve fund for additions and betterments was $416,023. During 1913, $1,113,329 was spent on additions and betterments, of which $513,535 was charged to the additions and betterment fund, and $599,794, to capital account. On June 30, 1913, the reserve for additions and betterments was $502,488. The surplus in 1912 was $117,554. In 1907 the surplus after paying the preferred dividend was $4,608,207, out of which was paid the last dividend on the $25,000,000 common stock, which amounted to $1,250,000, or 5 per cent. The net credit to profit and loss in 1913 was $3,835,305, compared with $117,554 in the previous year and $1,358,207 in 1907, during which year $2,000,000 was credited to the additions and betterment fund.

During June, 1913, $55,000 of the second installment of $2,000,000 short term notes, due October 1, 1913, were redeemed. The balance of this issue will be paid at maturity. In January, $1,200,000 of the authorized issue of $6,000,000 5 per cent. notes dated July 1, 1912, were sold. After October 1, 1913, there will be $6,800,000 notes outstanding which will mature as follows: $2,000,000 on October 1, 1914; $1,600,000 on July 1, 1915; $1,600,000 on July 1, 1916; and $1,600,000 on July 1, 1917.

Although the company had on hand at the end of the year a relatively small amount of cash—a little over $1,500,000—and expects to pay off in cash nearly $2,000,000 notes on October 1, it is understood that there will not in all probability be any need for a renewal of notes or for any extensive borrowing on short term paper. There were at the end of the year $13,326,000 accounts collectible and nearly $1,000,000 bills receivable. Since the greater part of the American Locomotive Company accounts and the paper accepted are for 30 days, these accounts have been falling due more rapidly since June 30 than has the necessary extension of the company's own credit to meet the requirements of new business. It is expected, therefore, that there will be no difficulty in permanently retiring the October 1 notes and still having sufficient cash to meet current requirements. Total current liabilities on June 30 amounted to $13,726,383, which included $8,745,000 notes, of which the October 1 maturities are a part, and $4,464,169 accounts payable.

The report of President W. H. Marshall is in part as follows: "With a view to keeping pace with the constantly growing market in Canada, which for some time has been more than the Montreal plant could meet, there was authorized an expenditure of $550,000 for extensions to that plant which, when completed about January, 1914, will increase its capacity to 35 engines per month, or about 40 per cent.

"The board of directors at a meeting held August 13, 1913, resolved to discontinue the manufacture of automobiles and motor trucks. The automobile department, since its start in 1905, has been unprofitable to the company and the prospect for the future of carrying on the business successfully is so uncertain as not to warrant, in the judgment of the directors, a continuance in this field of industry. Out of the accumulated surplus of the company, a reserve of $2,300,000 has been created to meet any losses that may occur in the liquidation of this business.

"The company takes this opportunity to assure the owners of Alco vehicles that arrangements will be made to furnish them with repair parts for a period of not less than five years to come and, further, that it will fulfill in every respect its obligations given under guarantee to its customers.

"The annual physical inventory of materials and supplies was taken at the close of the year, and priced at cost, unless such cost was above the market value on June 30, 1913, in which case the market price was used.

"The balance sheet includes a charge of $702,378, representing equipment trust notes discounted by this company in advance of maturity, and, as there is a possible obligation, in the event of any default in payment, a like amount is also shown as a contingent liability. The notes are secured by a lien upon the locomotives, and the security is ample. There has been a decrease in this amount since last year of $827,189."

The convertible assets and current liabilities on June 30, 1913, and June 30, 1912, were as follows:

Convertible Assets.	1913.	1912.
Cash	$1,562,474	$4,375,540
Accounts collectible	13,326,031	9,924,566
Notes receivable	996,239	777,592
Accrued interest	1,770	13,123
Material and supplies	5,749,234	5,688,823
Cortract work in course of construction	3,975,022	2,051,187
Industrial locomotives and automobiles manufactured for stock	1,298,256	952,621
Total	$26,909,026	$23,783,454

Current Liabilities.

	1913.	1912.
Coupon notes	$8,745,000	$8,600,000
Loans payable	.....	1,500,000
Accounts payable	4,464,169	4,503,233
Accrued interest	79,479	92,876
Unclaimed interest	235	450
Dividends on preferred stock payable July 21, 1912	437,500	437,500
Total	$13,726,383	$15,134,059

NEW BOOKS.

The Universal Directory of Railway Officials, 1913. Compiled under the direction of S. Richardson Blundstone. Published by the Directory Publishing Co., 15 Farringdon avenue, E.C., London, England. Price 10 shillings.

The nineteenth edition of this directory of railroad officers, which is compiled from official sources under the direction of the editor of the *Railway Engineer* (London), includes not only the principal steam railroads in the United Kingdom, Europe, Asia, Africa, North and South America and Mexico, but also includes tramways and electric railways in the United Kingdom. While, of course, space permits of giving the name and address only of the higher officers in each department of the railway, the compilation is the most comprehensive in its field of anything that we know of and should be of great use in the general offices of railway supply houses having some foreign clientele. The work of compilation is done very carefully and the addresses are given in the language of the country, so that if copied on a letter exactly as found in the directory, should prevent the return of letters through the dead letter office. The first section of the book is arranged alphabetically by countries and the second section alphabetically by persons.

Sayings and Writings About the Railways. Paper bound; 4½ in. x 6¼ in.; 240 pages. Published by the *Railway Age Gazette*. Distributed by the McGraw-Hill Book Company, 239 W. 39th street, New York. Price, 25 cents each, with special price for large quantities.

If a person interested in American railway problems during the past few years had carefully preserved and indexed every instructive utterance of the principal railroad presidents, financiers and governmental authorities on the subject indicated; and also of the most noted scholars, students, statesmen and investigators of the subject, as published day by day in the newspapers and magazines, he would deem himself the possessor of a valuable treasury of facts. This task has been done for him by the author of this little book; and the mass of matter, really varied, rich and comprehensive, is condensed into a small but thick pamphlet which can be carried in the pocket.

The character of the matter included is indicated by the subheads: What Railroads Have Done and What They Mean to Civilization and Prosperity; Who Owns the Railways? Efficiency and Safety; Taxation; Wages and Labor; Some of the Present Needs; "What the Traffic Will Bear"; Rates and Rate Making; Regulation and Legislation; Capital and Credit; Government Ownership and Valuation; Railways and Canals. There are about two hundred quotations, nearly all of them quite short; and the list of names of authors includes apparently nearly every railroad president who has expressed his views in public. Of authors other than railroad officers the following is a partial list, which will indicate the great extent of the field covered: William M. Acworth, Henry C. Adams, Joseph G. Cannon, William J. Cunningham, James O. Fagan, A. T. Hadley, H. S. Haines, Charles E. Hughes, Emory R. Johnson, Martin A. Knapp, H. T. Newcomb, Neville Priestly, Logan G. McPherson, Theodore Roosevelt, Simon Sterne, William H. Taft and Woodrow Wilson.

The compiler of this aggregation is frankly "pro-railroad," and an anti-railroad agitator would call him prejudiced; but the material furnished is so voluminous and is the product of such strong minds that no reader will lack food for thought on all sides of the railroad problem.

Letters to the Editor.

A WELL-QUALIFIED CRITIC.

New York, August 20, 1913.

To the Editor of the Railway Age Gazette:

I have read with interest a number of articles referring to the fact that the managements of railroads are actually hiring people to criticize what is wrong in the administration of their properties from a public point of view.

It strikes me that the principle is very good, but that the expenditure of money for that purpose is needless. Railroad men are part of the public, but they travel more than most other people. They travel mostly on passes.

It seems to me the least thing a railroad man can do, in consideration of free transportation, is to write to the management of the railroad company over which he happens to travel and tell them whatever he may have noticed which is worth criticizing. I have practised this golden rule for a number of years and have received some letters which show that my criticism was greatly appreciated. F. J. Lisman.

CAR MOVEMENT AND INTERCHANGE.

New York, August 16, 1913.

To the Editor of the Railway Age Gazette:

In trying to give more movement to freight cars opportunities for improvement will often be found at points of interchange. This is because the responsibility for the facilities and operation at interchange points is largely divided between the two railroads concerned. They must agree before interchange tracks are provided at all; each road is careful not to get the worst of the deal; and undue economy of one road may result in lack of needed facilities by both.

Again, proper operation at an interchange point means co-operation, and where this is lacking delays to cars are inevitable, especially where co-operation is replaced by rivalry. It is good, of course, when a superintendent points out with pride that "he has never been blocked at X by the Y. & Z. railway," but it is bad when he is equally proud of being able "to block the Y. & Z. at X whenever he wants to," although it is a very rational piece of human nature.

Sometimes when an interchange point is blocked it is very difficult to find out why it was blocked, and thus guard against repetition. The yardmasters of the two roads will differ radically, and it is very hard to make them co-operate for the future, to say nothing of analyzing the past. To prevent such difficulties the manager will require fuller car reports from points of interchange than from other points, and will see that these reports are checked periodically against the reports of the connecting lines, so that the yardmasters of both roads will work on a common basis.

A full report from an interchange point would show at the reporting hour—say midnight—in each direction, (1) the cars moved from the interchange track in the past 24 hours, (2) the cars on the interchange track, and (3) the cars in yard and not moved to the track. It is not meant that all these items should be sent by wire from every interchange point daily, but every yardmaster should record these facts daily, after checking them with his neighbor, and should be prepared to report them upon the least sign of congestion. It is often desirable to have item 3 reported regularly from the larger points. This figure shows cars for interchange which have not reached interchange tracks for one reason or another. If it grows large it indicates trouble. If it grows larger than the daily movement it is the basis of an expensive per diem reclaim, sign of a more expensive delay.

If this figure is kept low it indicates that facilities are ample and interchange is prompt. Arthur Hale,

General Agent, American Railway Association.

A CLAIM OF THE COMMISSION.

FORT WORTH, Texas, July 24, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the twenty-sixth annual report of the Interstate Commerce Commission, on page 60, the following statement is made:

> One result already apparent from the operation of the hours of service law is that the number of train miles run for each trainman employed has considerably increased since the law became effective. This increase is especially significant in view of the fact that for a number of years previous to 1908 there was a steady decrease in this item.

It may be supposed that the commission compiled figures and that this statement is justified, but many men in positions to know believe the facts are directly contrary.

So far as I can learn the mileage of the individual train or engineman has decreased since the hours of service law went into effect. The law restricted their runs, cut down long divisions, prevented doubling back into home terminals, tied them up at intermediate points, and reduced their earnings, increased the number of crews and also increased their expenses when tied up.

A great number of train and enginemen complained of reduced wages, of having to move their homes and change runs. It is true that since 1908 the rate of pay has increased and that the hours of service law was used as one reason for asking increases; also it is true that labor agitators supported it like full crew bills to increase the number of men and standardize or rather equalize wages and do away with preferred runs.

On many western roads when business fluctuated prior to 1908 during rushes, freight crews often made nearly as much in one month as they do now in two months with increased rates. Another cause that reduces mileage is the necessity of greater efficiency by reason of increased costs, bigger trains are hauled and speed reduced, freight train tonnage in many cases has been doubled.

On first class roads the number of hours per trip has frequently decreased, but not by reason of this law. Mr. Fox, general manager of the Atchison, Topeka & Santa Fe, says:

> The number of hours per trip have decreased. The principal reason for this is the additional facilities, such as passing tracks, yards, grade reduction, handling business currently instead of having it congested as was the case from 1903 to 1908, and ability of our motive power to handle its rating and consequently trains being on time and the loss of time in meeting and passing is practically eliminated.

Shorter hours are due to better efficiency of the plant and not to the law.

Mr. Fox prepared a statement, which I attach, showing mileage made by eight conductors in service full month in 1906 compared with same information for 1912, which indicates 30,563 miles less made by the crews in 1912 than was made in 1906. The overtime in 1912 was 1½ per cent. of their total pay roll earning, while the overtime in 1906 for the same service was approximately 11 per cent. of the roll.

These eight conductors worked on the western division where the conditions were about the same in 1912 as in 1906. On the Colorado division overtime in 1906 was 12½ per cent., in 1913 it is about 4 per cent.

On the New Mexico division in December, 1906, the mileage was 3,635 miles per man, for 1912—3,512, but overtime in 1906 was 16½ per cent., while in December, 1912, it was only 7¼ per cent., this being a mountain division. On the Rio Grande division conditions have materially changed, light engines and ordinary trains run in 1906 while heavy power used in 1906 with a big increase in tonnage. The average miles per man in 1906 was 2,761, in 1913, 2,623, which is about 13 miles less per man. Overtime in 1907 was 9 per cent., while in 1913 it averaged 6 per cent.

It is assumed that this statement is typical and fairly represents general conditions on most western railroads, and from it and general knowledge of other lines I feel sure the commission's conclusions are not warranted and were made because they looked well in print.

I do not intend to criticize the law, the railroads had to have it; but I believe the commission is not entitled to the claim made.

AVERY TURNER,
Receiver, St. Louis, San Francisco & Texas.
WESTERN DIVISION.

Comparative statement of mileage made by eight conductors making highest mileage each month for the years 1906 and 1912.

Year.	Month.	Miles.	Year.	Month.	Miles.
1906	January	35,619	1912	January	33,188
1906	February	27,591	1912	February	24,229
1906	March	34,284	1912	March	33,313
1906	April	31,659	1912	April	30,115
1906	May	31,914	1912	May	21,477
1906	June	27,154	1912	June	21,222
1906	July	30,206	1912	July	24,984
1906	August	28,698	1912	August	28,098
1906	September	30,051	1912	September	29,599
1906	October	30,657	1912	October	32,176
1906	November	31,127	1912	November	29,576
1906	December	30,767	1912	December	31,187
	Total	369,727		Total	339,164

A decrease of 30,563 miles.

LOCOMOTIVE BOILER CIRCULATION.

BALTIMORE, Md., August 6, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest the criticism by Walter D. Wood, published in your issue of August 1. While I was reading this letter, I could not help but see the last paragraph of Mr. Wood's letter on another subject, which read as follows: "Tradition and past performances are hard things to fight, and many an inventor has gone down to discouragement simply because he had something which others had tried and said couldn't be done." While I do not claim to be an inventor, and have had no feeling of discouragement as yet, I rather feel satisfied that the article on "Life of Fireboxes" will be a means of placing our designers on the alert, with a view of taking advantage of every opportunity towards increasing the life of fireboxes.

While in my article I did not claim that this circulation did represent truly the actual conditions, I did claim, and do maintain, that without exception it represents the direction of the circulation of the different shaped water legs, and I bear my argument out by the life of the different types obtained in service, also by the manner in which the silica, which was used in the test tubes to show the circulation more clearly, precipitated.

I have had considerable experience with sensitive pyrometers in locomotive test work taking firebox temperatures; they are very sensitive to any vibration, so much so, that I do not think sufficiently accurate results could be obtained so that any conclusion could be formed. A better means would be an adjustable try cock, which could be placed at various distances from the inside sheet; this would show how far from the sheet the steam bubbles force the water, but it would not be of any benefit as regards the outside sheet; and to use a pyrometer to obtain the direction of circulation near the outside sheet would not be practicable.

C. T. ROMMEL.

NEW STATION FOR ABERDEEN, SCOTLAND.—A contract for erecting a large new station at Aberdeen by the Caledonian Railway and the Great North of Scotland Railway has been awarded to P. & W. Anderson, of Glasgow; estimated cost, $700,000. The station will be built principally of steel, with large sections of masonry and brickwork.

RAILWAY CONSTRUCTION IN RUSSIA.—The Russian government has consented to the construction of two new railway lines, the Odessa-Vilna and the Odessa-Zhlobin. The latter line was built as far as Zhlobin some years ago, but conditions then prevented its completion. It will be extended to join the main line of the Southwestern Railway, the work being done under supervision of the ministry of railways. The Odessa-Vilna line will be constructed by private capital to connect regions in the northwest with the Black sea.

CONSTRUCTION OF NEW QUEBEC BRIDGE PIERS.

Methods Used in Sinking Very Large Caissons and Building Concrete and Granite Piers for St. Lawrence River Structure.

By H. P. Borden.*

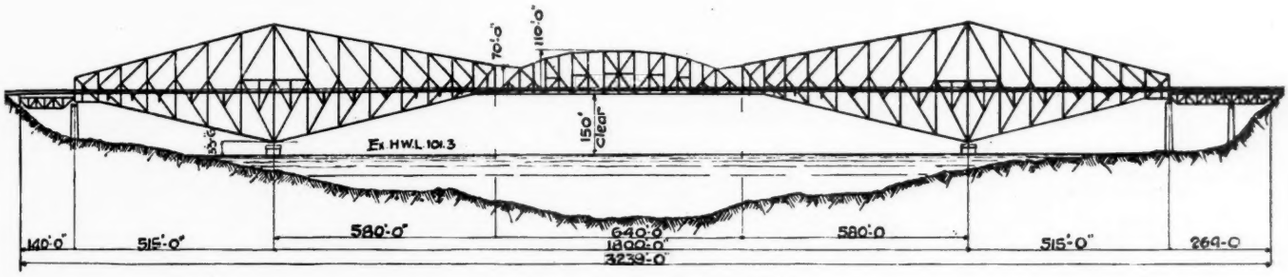
When the partially erected superstructure of the Quebec bridge, located about seven miles above the city of Quebec, collapsed in 1907, very little damage was done to the piers. One of the first questions taken up by the Board of Engineers appointed by the Dominion government to redesign and construct this bridge was whether the old masonry could be used for the new bridge. After a considerable number of preliminary designs had been worked out it was found that to construct a bridge that would be safe under all possible conditions, the structure should be made wider than the old, and that the weight of the steel would have to be very materially increased.

As the pressure on the foundations of the old piers was designed to be practically nine tons per square foot, which was considered sufficiently high, and as there seemed to be no satisfactory means of reinforcing or enlarging the piers, it was necessary to take down the old masonry and construct entirely new piers. As the tracks of the Transcontinental Railway had, at a very heavy expense, been brought up to the abutments of the old bridge, it was decided to maintain the old center line. The new piers were, therefore, designed to go just south of the existing piers, the north main pier being 65 ft. farther out into the river and the south main pier the same distance in shore, thus preserving the original length of the center span, 1,700 ft. The only important difference, therefore, in the layout of the masonry is that the approach spans between the abutments and anchor piers are of unequal length, and on the north side this requires an intermediate pier.

*Assistant to Chief Engineer, Board of Engineers, Quebec Bridge, Montreal, Que.

It was found that the north and south abutments could be used without any radical changes. A series of borings was taken, from which it was learned that rock under the site of the new north main pier could be reached at a depth of about 70 ft., and on the south side about 86 ft. below the river bottom. The foundations of both anchor piers were well above high water mark, and rock was reached with very little excavation. The designs for the masonry, as finally approved, contained the following quantities of masonry:

North abutment (alterations)	375 cu. yds.
North intermediate pier	1,666 cu. yds.
North anchor pier	17,736 cu. yds.
North main pier	31,860 cu. yds.
South main pier	38,269 cu. yds.
South anchor pier	16,128 cu. yds.
South abutment (alterations)	26 cu. yds.
Total	106,060 cu. yds.

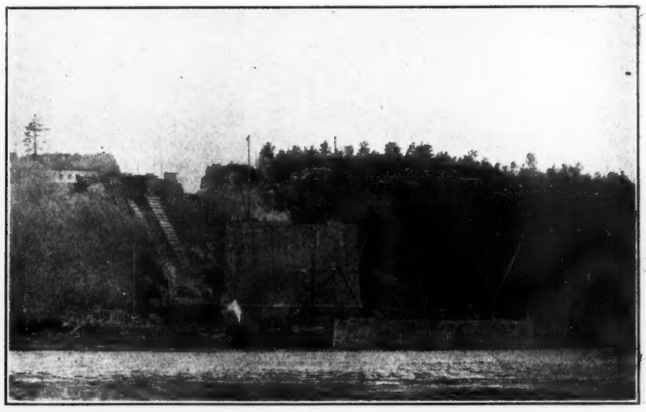


Elevation of New Quebec Bridge.

NORTH MAIN PIER.

Work was started on the sinking of the caisson for the north main pier in the spring of 1909. This caisson was a huge structure 180 ft. long and 55 ft. wide built of 12 in. x 12 in. long leaf southern pine. The caisson was built on launchways about three miles from the bridge site and launched and floated into position without any difficulty. After about 2,000 yds. of concrete had been deposited in this caisson, and it was about ready to ground on the bottom, an accident happened to the pumping machinery, and before it could be repaired the caisson had filled with water and had settled on an uneven bottom, seriously straining the structure and opening up the joints to such an extent that air could not be kept in the working chamber. It was decided to

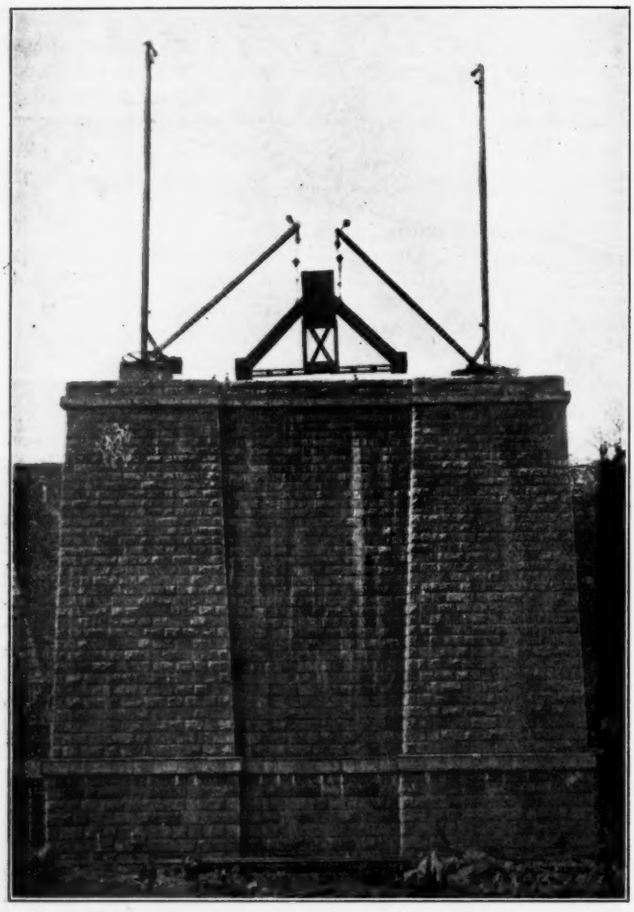
General View of Plant on South Shore.



General View of North Side Showing Main and Anchor Piers and Abutment.

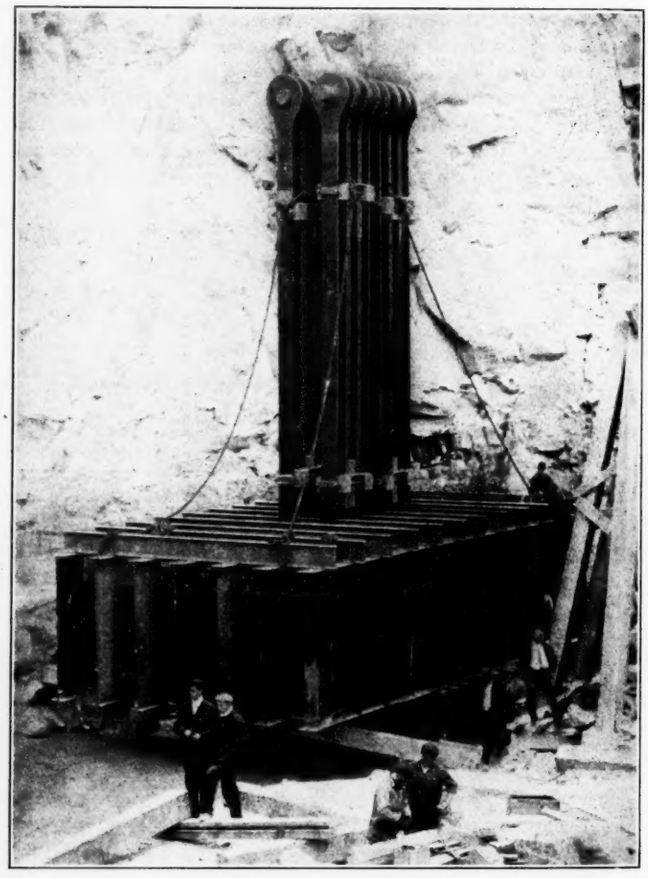
take out the masonry already deposited and to float it into dry dock and have the necessary repairs made.

As the sinking conditions were much more difficult on the north shore than on the south, it was decided to construct new caissons in two sections for the north pier and use the old caisson for the south main pier. Two new caissons were started immediately, each 85 ft. x 60 ft. They were constructed and floated in the spring of 1910 and sunk in position outside the old pier, being situated 10 ft. apart. The work of sinking these caissons progressed satisfactorily all season. The material encountered was very difficult, being a mass of boulders with only sufficient sand and gravel to fill the interstices. The rate of sinking of the west caisson was 0.37 ft. per day, and of the east 0.47 ft. per day. It was the original intention to sink these caissons to rock, but as the work progressed the sinking became more difficult and finally when the caissons had reached a position 20 ft. above rock, it was considered that the foundations at this point were quite satisfactory for many times the load that the piers would be called upon to carry. Tests were made of the bearing quality of this foundation and it was found that it sustained 60 tons per sq. ft., with practically no settlement. As the working load was only 8 tons per sq. ft. operations were stopped at this point, which was about 45 ft. below the bed of the river and 80 ft. below high tide. The working chamber was then sealed up, after which a thin grout was forced, by compressed air, down all the air pipes and shafts in order that all the interstices might be thoroughly filled. The space between the two caissons was then excavated with a clam shell bucket until all the loose material had been removed and this space was filled with concrete, flush with the top of the two caissons. The pier shaft was then started on this foundation and the work was continued up to a point above high water.



North Anchor Pier Showing the Wind Anchorage Steel.

As this pier is located about 500 ft. from the shore and is practically surrounded by water at all stages of the tide, a heavy platform was built around all sides of the caisson with two long trestles leading to the shore. On the platforms around the pier were located six stiff leg derricks with 75 ft. booms and 15 ton capacity which were used in handling stone, concrete, and also removing buckets of material through the service shafts in the caisson. Double tracks led down from the shore to the pier over the two trestles, on which were transported the stone from the cliff above and the concrete from the mixers situated at the foot of the cliff. All the principal materials and supplies were received by rail and teams on top of this cliff, which is about 160 ft. above high water level, and delivered by gravity to the concrete plant and service tracks on the pier.



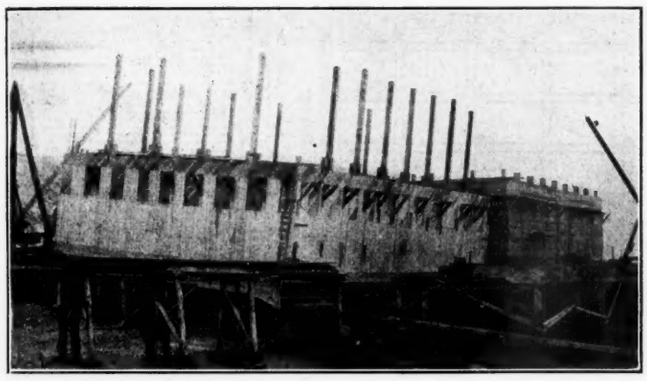
Setting Anchorage Steel in South Anchor Pier.

An elevator inclined about 45 deg. transported the heavier material between the two levels. Stone and sand was dumped into chutes from cars at the top of the cliff and led to the crusher plant and concrete mixers below. Coal was led to the boiler plant in the same way. Cement was brought down an inclined railway on balanced cars to the storehouse along the mixing platform.

At the start air was supplied by four 24 in. x 30 in. Ingersoll-Sargent air compressors discharging into a 12 in. main which acted as a reservoir and supplied the caissons through three 7 in. branches each with a gate valve outside the caisson. Later on this capacity was found to be insufficient for emergencies, and about 50 per cent. more the capacity was added. The compressors were operated by 600 h. p. horizontal boilers, which was increased about 30 per cent. before the work was finished. At the present time this pier is completed with the exception of the last few courses of masonry.

NORTH ANCHOR AND INTERMEDIATE PIERS.

The north anchor pier was 137 ft. long by 28 ft. 6 in. wide at the base, and 128 ft. 6 in. long and 20 ft. wide at the top. Below the ground line it was constructed of solid concrete, and above the ground line the facing is of granite with concrete backing. The pier itself is 156 ft. high. The courses range from 4 ft. at the bottom to 2 ft. at the top. This pier was finished this month. During last July the work on this pier proceeded at the rate of one course per day, including the time required to change the derricks. The work of changing these derricks, which operation is necessary every third day, has been reduced to a minimum. In the two anchorage wells in these piers the contractor has constructed wooden false work in sections. Each section is about 6 ft. high. Two guy derricks are raised on this false work which handles the stone for the facing of the pier. When it is necessary to lift the derricks an "A" frame gantry is hoisted on to the top of the masonry, which after being placed lifts the derrick mast about 6 ft., the guys being slacked as the mast is lifted. Another 6 ft. section of the false work is then placed under the derrick mast, which is then lowered in place and the guys tightened. This operation is carried out for both derricks before 7 o'clock in the morning. The operation takes from three to four hours each time. The work



Caissons Ready for Launching.

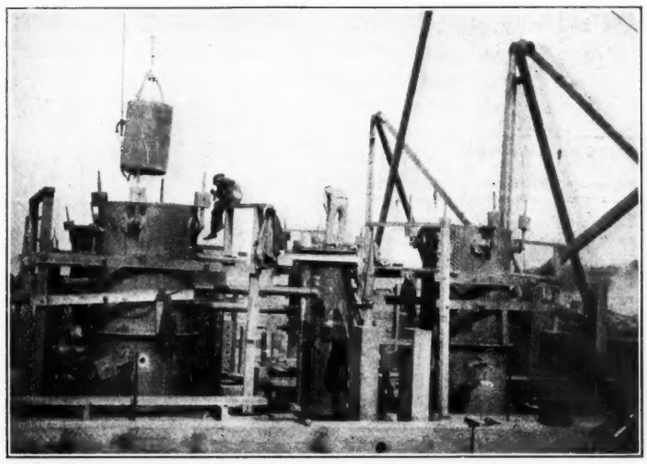
therefore of laying the stone is not interfered with at all by the operation of shifting derricks.

The intermediate pier on the north side was a very simple piece of construction, the pier itself being 61 ft. 6 in. long, 14 ft. wide and 63 ft. 9 in. high, built of granite facing and concrete backing. This work has been finished.

SOUTH MAIN AND ANCHOR PIERS.

On the south side of the river the large caisson originally intended for the north side was used for the south main pier. As the river bottom is exposed at this point at low water an absolutely level bed could be secured. After this caisson had been thoroughly repaired in dry dock it was towed to the site and placed accurately in position without any difficulty. The sinking of this caisson was started and finished last season. The material encountered was of a very different nature from that on the north shore. At this point fine sand with a small quantity of boulders was met practically throughout the entire depth. The work progressed very much more rapidly, and an average penetration of 0.75 ft. per day was maintained during the entire period. This caisson was carried down to bed rock some 86 ft. below the bed of the river and 101 ft. below high water. The caisson was divided into 18 compartments; each compartment was supplied with a water jet at 100 lbs. pressure, which was used to loosen the sand and gravel. Each chamber was also provided with a 6 in. blow pipe through which a very large proportion of the material was removed by means of compressed air.

Both the north and south caissons were supplied with electric lights, so that the work could be performed at all times under the very best conditions. This caisson was fitted with three material shafts and four 3 ft. ladder shafts with air locks at top and bottom. The main ladder shaft, however, was fitted with a 6 ft. horizontal steel cylinder about 30 ft. long, located just above the deck of the working chamber and was built permanently into the concrete. This cylinder was large enough to hold the entire shift of "sand hogs" during the process of going in and coming



Service and Ladder Shafts of Caisson at North Main Pier.

out of the caisson, thus effecting a considerable saving of time and in air consumption. Owing to the fact that this caisson had received a certain amount of unknown damage at its first sinking, the greatest care was taken to prevent any further damage taking place. For this reason special appliances were devised for relieving the cutting edge from carrying all the load, and, by the use of sand jacks, the weight of the caisson was distributed over the entire bottom area. The manner of using these sand jacks was one of the most interesting features con-

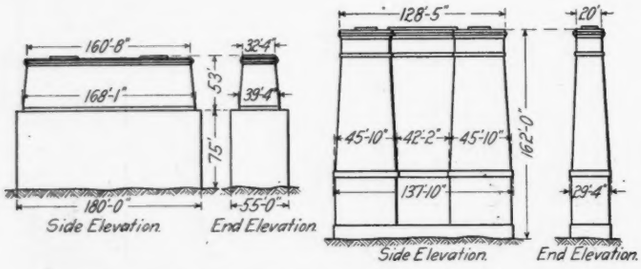
General View of Boiler Compressor, and Mixer Plant on North Side.

nected with the sinking of this caisson and merits special description.

The jacks themselves were of very simple construction. The cylinders of the sand jacks had an internal diameter of 31 in., and were 36 in. long, constructed of ¼ in. steel plate with 4 in. lap joint; two angles 1½ in. x 1½ in. x ¼ in. reinforced the cylinder at top and bottom. The piston was a block of yellow pine 2 ft. 6 in. square and 5 ft. long. Four feet at one end was

round with a diameter of 29 in., thereby allowing 1 in. play in the cylinder. The lower end of the piston was reinforced by a 2½ in. x ⅜ in. welded iron band. During operation the piston was attached rigidly to the roof of the working chamber by long screw bolts, and remained there permanently during the entire period of sinking.

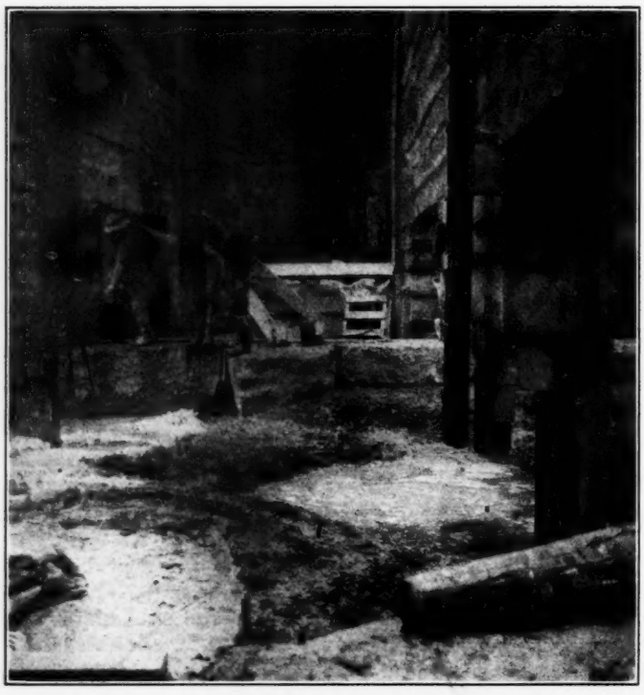
In preparing for a drop, the first step was to excavate a hole under the piston. The cylinder was filled about two-thirds full of sand and placed in position under the piston and blocked up hard against it by means of timbers. While this was being done the caisson was supported on timber blocking under the bulkheads and other points. At the bottom of the sand jack was a 2 in. iron pipe extending entirely across the cylinder, the center



South Main Pier and North Anchor Pier.

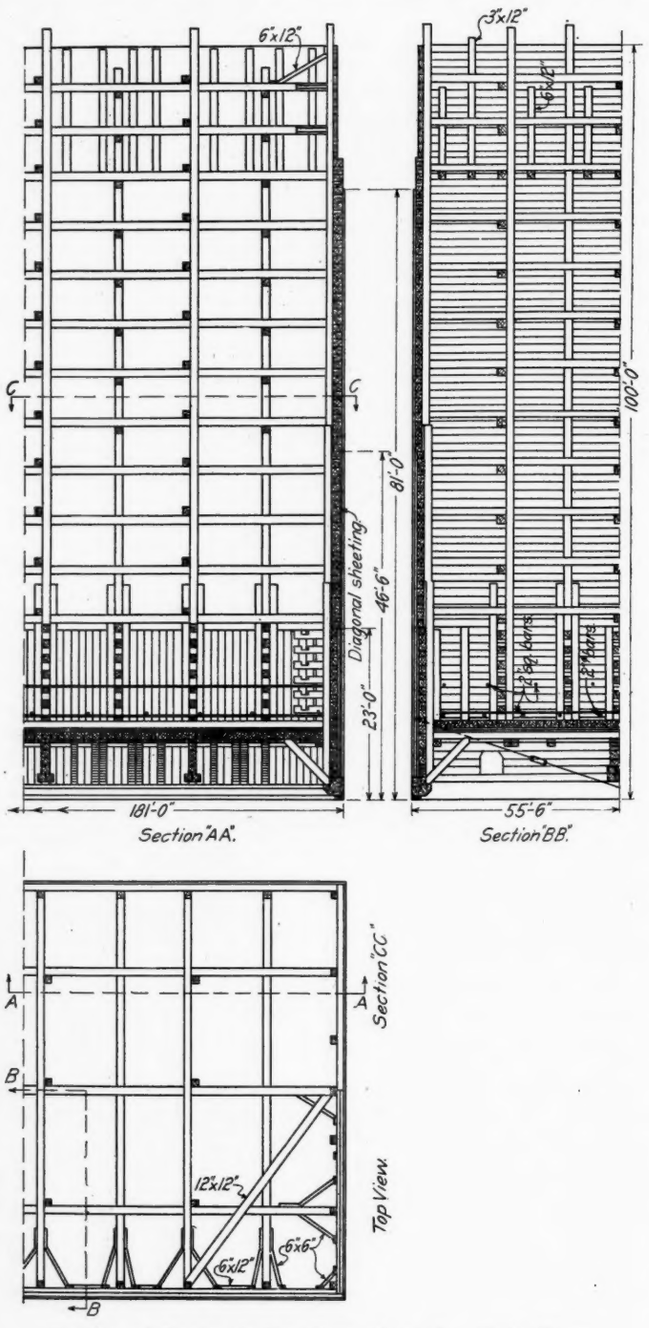
of which was split and opened up to allow the sand to escape. This type had no bottom to the cylinder, the timbers acting as a support for the sand. Another type used had a steel bottom and two 3 in. holes with sliding cover at each side at the foot of the cylinder. The operation in both cases was the same.

When everything was ready for a drop, the timber blocking supporting the caisson was undermined by a water jet and the full load taken by the sand jacks. A man was stationed at every jack, and at a given signal, afforded by the flashing of the electric lights, each man turned a hydraulic jet with 60 lbs. pressure into the hole at the bottom of the cylinder, thus washing the sand out. The sand was caught in canvas bags of uniform size. When the canvas bag was full the lights flashed again and the water jet was turned off. Another bag was then obtained, and at the signal the jet was again turned on and the



Laying Masonry in Caisson of North Main Pier.

bags filled. Each cylinder contained in the neighborhood of 16 bags of sand, and this operation was continued until the cylinder was entirely emptied. By adopting the signal system and emptying the sand into bags, it was possible to guarantee that the whole caisson was being sunk at a uniform rate, and that there was no reasonable possibility of any part of the caisson being strained by being sunk more rapidly than another portion. As a rule a drop of from 18 in. to 2 ft. could be effected at each



Details of Large Coffer Dam Used for Main Piers.

operation, the recurrence of the operations depending entirely on the nature of the material to be removed. When the drop had been finished the blocking was again placed under the bulkheads to take the load off the caisson, and the holes under the sand jacks deepened in order that the operation might be repeated.

The plant for sinking this caisson was approximately the same as that for the north side, only of considerably greater capacity. The rock used in the concrete was quarried from the top of the cliff and carried by chutes to the crusher below. Sand, cement,

gravel and coal were also brought by gravity to the lower level from the railroad tracks leading in above. Two 1⅓ yd. concrete mixers supplied the concrete which was taken in cars from the mixers to the loading platforms by gravity, the empty cars being drawn back by horses. The caisson stopped at elevation 1.31, the material being cleaned away about 2 ft, lower. The concrete was carried up to elevation 75.0, at which point the masonry shaft starts. The pier proper has a facing of granite blocks with backing of concrete, the last nine courses of both north and south main piers being solid granite.

Every facility for the men was supplied by the contractor. A steel hospital tank and hospital quarters were within a few yards of the caisson with a doctor continually in attendance. Shower baths, coffee rooms and boarding houses were constructed right on the site.

The south anchor pier has the same dimensions as the north anchor pier, except that this foundation does not go quite so deep. Work was started this year and is being pushed ahead during the present season.

Every effort is being put forth by the contractor to have this entire contract completed before winter sets in, in order to make way for the contractor for the superstructure, who is now on the ground.

The bridge is being built under the direction of C. N. Monsarrat, chairman and chief engineer, C. C. Schneider and Ralph Modjeski, members of the board of engineers, and John D. Wilkens, resident engineer. M. P. & J. T. Davis, Montreal and Quebec, are the contractors for the substructure. S. H. Woodard is chief engineer for the contractors.

MASTER BLACKSMITHS' ASSOCIATION.

The twenty-first annual convention of the International Railroad Master Blacksmiths' Association, which was held in Richmond, Va., last week, as noted in our issue of August 22, page 346, was well attended and a number of important papers were read. W. H. Owens, master mechanic, Southern Railway, Manchester, Va., was present at the meeting on Wednesday and gave a short address.

FLUE WELDING.

E. J. Hoskins read a paper on this subject in which he stated that at the Lake Shore & Michigan Southern shops at Elkhart, Ind., five men in the blacksmith shop weld from 6,000 to 8,000 flues per month. In the erecting shop at this point the pits are so short that large superheater flues cannot be removed from the boilers without opening the erecting shop doors. To avoid cooling the shop in winter and to provide a special platform for applying superheater elements and the large tubes, there have been designed special cars that fit into the door opening. These serve the purpose of a door and also provide a convenient platform for the workmen in removing or applying superheater units and tubes.

Fred B. Nielson, Oregon Short Line, Pocatello, Idaho, stated that he considered it of more importance to swedge the flues than to weld them.

At the Ludlow, Ky., shops of the C. N. O. & T. P. there have been repaired 625 superheater flues from January 1, 1913, to June 1, 1913. A 2½-in. roller machine has been so converted that it can be changed in 20 minutes to weld 4½-in. or 5½-in. safe ends on superheater flues, by changing the mandrel and using the same rolls that are used for welding 2 in. or 2½ in. flues.

TOOLS AND FORMERS.

There was considerable divergence of opinion among the members regarding the use of tools in the smith shop. Some of those present considered that it was very easy to waste money in the making of tools and stated that they did not make tools for any job unless there were a large number of pieces to be made. Others stated that they believed there were very few jobs of any importance for which it did not pay to make special tools.

ELECTRIC WELDING.

Joseph Grine, New York Central & Hudson River, Depew, N. Y., read a paper from which the following is an extract:

"In connection with many others, our first experience with electric welding was very disappointing and failures were so many that at one time we came pretty nearly giving up the process entirely. With the discovery of an error in the adjustment of our machines, and its correction, marked improvements in results were obtained at once. We have two electric welding outfits, which have been operated day and night since May, 1912. At one of our shops 102 broken locomotive frames located in all varieties of places and on all sizes of power have been welded, and so far without a single failure; we believe it the easiest and cheapest method of welding frames without removal from the locomotive. There is no expansion or contraction to contend with in making such welds, and after completion the frame is in its original position. There is also a minimum amount of stripping needed.

"In frame welding the machines are adjusted to work at 147 amperes and 60 volts. The frames are prepared for welding in a similar manner to that for welding over a fire. They are "V'd" out by means of the oxy-acetylene machine, the oxidized surface left by the burner being then chipped off by an air hammer and chisel so that a clean surface is presented for the electric welder.

"The following is the total cost of welding frames of three different dimensions:

Frame 5 in. x 5½ in.	
Labor	$5.63
Material	3.38
Total	$9.01
Frame 4 in. by 4½ in.	
Labor	$4.01
Material	2.51
Total	$6.52
Frame 4 in. x 2½ in.	
Labor	$3.03
Material	1.95
Total	$4.98

"This includes the oxygen used to prepare the flame, wire necessary for welding, as well as the cost of the current used.

"Another item of saving effected by the process during the past winter is the filling up of flat spots on 46 locomotive driving wheel tires, these spots running in length from 2½ in. to 4½ in. It would, of course, have been necessary to turn these tires had it not been for the electric welder."

DROP FORGING.

G. F. Hinkens, Westinghouse Air Brake Company, gave it as his opinion that the secret of drop forging is in making the dies, and the secret of the die is in making the preparatory part so as to get the stock in the right place before placing it in the finishing die. There is a great deal of skill required by the die maker. He does not think that the ordinary machinist, until he has the experience, can make a die for a drop forging from a blue print or from a model unless he is instructed by somebody who knows how the die ought to be made. The next important thing is the hardening of the die. Drop forging dies are very expensive, and the cost of the work depends on the number of forgings that can be made.

At the Pennsylvania shops at Altoona, Pa., there is in use a 12,000-lb. steam drop hammer which is producing forgings weighing from 100 to 300 lbs. The dies for this hammer have to be well heat-treated. A hydraulic trimming press with a capacity of 200 tons is used.

SPRING MAKING AND REPAIRING.

In a committee report, G. M. Stewart, Pennsylvania Railroad, Altoona, Pa., said that with the use of machinery and a pyrometer it is possible to turn out much more accurate spring work than by hand. The report continued: "There has been installed in one of the Pennsylvania shops a machine for making springs which has proven a success, not one failure having been found in the making and adjusting of 2,000 plates recently turned out.

This machine shapes the plates properly, the pyrometer being used to get the correct temper, and all the plates being exact duplicates. It also shows a saving of not less than 30 per cent. in the cost of production. I may be somewhat premature in saying that elliptical springs will sooner or later be made by machinery, and without the use of a hammer, but in a number of shops this method is now in every-day operation and has resulted in a decided saving and a better spring. An objection may be raised to the machine method on account of the large number of designs of springs generally made or repaired in railroad shops. To induce the designing engineer to change designs will take time. However, if it can be shown that a superior spring can be made at lower cost, the question of providing the proper machinery will at least receive careful attention, and we may also hope to see a number of springs eliminated which differ only slightly.

"A number of methods of manufacturing elliptical springs by machinery are now employed. All that I am familiar with do this work in a hydraulic press or a bulldozer. Two methods of bending the leaves have been called to my attention. By one of these a number of fingers set close together like piano keys are employed; these are set to the desired radius by cams or by bolting each finger separately. When these are set the working surface looks like a piano keyboard bent to the shape of a spring. When forming the spring plate it is pressed between two of these keyboards, or one keyboard and a second set of weighted fingers, where each finger has a separate weight. The hot leaf is placed on the keyboard and is forced against the weighted fingers, raising each according to the camber. This method looks promising, especially where a large number of designs are required. Another method employed is to use dies, or dies and easily-made liners, for each radius of spring leaf. This requires a number of die liners, but when once made they will last for an indefinite number of leaves. By this method the leaf is pressed while hot between two dies, either in a hydraulic press or bulldozer. Either method will make elliptical spring leaves more uniformly than by hand setting.

"For the large elliptical springs, such as are used on locomotives and cars, the taper put on the leaves is rarely correct, and if properly made it should only extend back from the end about one inch. As a matter of fact the leaves are tapered back two or three inches, and as a result the taper of one leaf extends over the taper of the leaf above, so that the object of tapering is not obtained. Some railways have done away with tapering spring leaves, which is a step in the right direction. In some cases the leaf is square at the ends as it leaves the shear when cut from the bar, and in other cases the corners are clipped off, making the end of the leaf look like a spear with the point cut off. Either method makes a good looking spring, and saves the cost of heating the ends for rolling the points. I believe that the tapering machine could be put on the scrap heap, as has been done in one shop that I know of. Omitting the tapering of the leaves makes it much easier to form by dies, as it is difficult to make dies to fit the tapered ends.

"There is a method of manufacturing elliptical springs in which a hydraulic press is used. This is a double or two-story press; that is, one press above the other, each controlled by three rams of 25 tons' capacity each; by suitable valves 25, 50 or 75 tons' pressure may be used, according to the size of the leaf. In the bottom part of the press the end corners of the leaves are clipped off and the nib formed at the center; in the upper half the leaf is formed to the proper radius or camber. Following the leaf through, the process is as follows: The leaves are cut to the proper length, placed in the furnace, and the ends are then cut and the nibs formed in the lower part of the press. Next, the leaf is formed to the proper camber in the upper part of the press, the third and fourth operations being made with the one heat. It is then allowed to cool, and next is heated to 1,500 deg. F. and quenched in oil; it is then heated to 800 deg. F. and allowed to cool in air.

"In every-day practice two men can easily cut, nib and form 600 leaves in a ten-hour day. To change from one length of leaf to another takes about 15 minutes; to change from one kind of spring to another takes from 15 to 30 minutes.

"Probably no piece of steel is hardened by a much worse method than the locomotive spring. No blacksmith would think of hardening a lathe tool in the crude method used in hardening springs, yet with the heavy equipment of today, the spring must stand much abuse."

PIECE WORK.

Geo. P. White (M. K. & T.):—Piece work enables a foreman to estimate the cost of work and the length of time necessary to do such work within a very small margin, for the workmen are after the money and know that it depends upon what kind of a day's work they put out, as to the amount of wages they will draw. For instance, we have 500 of a certain class of car to build. Knowing that our material is in stock and we have the drawings to work to, our first step would be to get out the forgings for the bottom, then the bodies and trucks. A foreman in a piece work shop should be able to tell within a day as to when certain forgings will be received for this work, as he knows the cost that he has to pay for each item, and would also know the amount that each workman would try to make. If it should come about for some reason that the company wanted this work several days ahead of the specified time, it is a very easy matter to push the work somewhat faster in a piece work shop than in a day work shop, for when the workmen see they are to benefit their pocketbooks, they will make every effort to get just a little more out each day.

J. H. Dalton (Erie Railroad, Huntington, Ind.):—We work piece work on new and repair work. Wherever there is piece work the output is greater and that is what we are looking for. Some say under the piece work system they get an inferior grade of work, but I don't think so. If a man does a job which will not pass inspection, send it back to him and let him do it over on his own time and he will soon begin to do his work right. Under the piece work system the foreman has got more time to look after his other duties, because if a man gets out of a job he will hunt up the foreman instead of the foreman having to watch him. He will also take better care of his tools and have them ready for the next job.

C. E. Lewis (Penna., Baltimore, Md.):—I have had about 29 years' experience with piece work, and think it is the only fair way to have work done. When the piece work system was first started at the Baltimore shops, there was a great deal of prejudice against it. The men seemed to think it was only another way of getting more work out of them, but they soon found that there was an advantage in it for them; and now if you ask a man to work day work he will become dissatisfied at once. I believe that all work should be done piece work. One of the worst things to contend with is that the prices are not set right at the beginning. If you get the price right at first, you will not have much trouble. When you set the price on a job of piece work be fair to the men as well as to the company.

OTHER BUSINESS.

There was some discussion on the subjects of case hardening, frame making and repairing, and the heat treatment of metals, and several illustrated papers on shop kinks, etc., were presented. There were also individual papers on "Cast Steel in the Blacksmith Shop" and "Efficiency" by George F. Hinkens.

The following officers were elected for the ensuing year: H. E. Gamble, Pennsylvania Railroad, Altoona, Pa., president; T. F. Buckley, Delaware, Lackawanna & Western, Scranton, Pa., first vice-president and T. E. Williams, Chicago & North Western, Chicago, Ill., second vice-president. The executive committee is composed of J. P. Sullivan, chairman; T. F. Keane, Fred Norris, J. F. Keller and F. F. Hoeffle. The executive committee was instructed to choose from Denver, Milwaukee and Buffalo for the place for next year's convention. The report of the secretary showed that there are 244 active members, 25 associate and 8 honorary.

INCREASING FREIGHT CAR EFFICIENCY.

Delays to Equipment in Yards, Their Causes, and Means Being Used on the Chicago & Alton for Remedying Them.

By B. A. Worthington,
President, Chicago & Alton Railroad.

Under ordinary conditions the transportation of freight is the principal source of revenue to a railroad company, and all the machinery at its command is put in operation for this one principal purpose. Except on a very few roads passenger traffic is a secondary consideration and unremunerative; all other sources of revenue are merely incidental. Maintenance, solicitation, operation—in fact all the energies of a railroad organization—converge upon this one point, the movement of freight traffic; and the efficiency with which this is accomplished is the most important factor in determining the net results of operation.

In dealing with car efficiency, these fundamental principles are seldom mentioned, inasmuch as they are fundamental and are therefore always taken for granted; but in reviewing the situation, it is well that we should fix firmly in our minds how car efficiency bears upon the general scheme of railroading, and that it is simply a refinement in the application of elementary principles. It is a course in physical culture for a railroad—a "training-down" process—as no railroad can hope to produce its best results loaded down with a dead weight of superfluous equipment which, instead of performing a natural and healthy function, merely saps financial strength.

Arthur Hale, in his article "Getting More Movement for Freight Cars," which appeared in the *Railway Age Gazette* for August 1, deals with the subject in a masterful manner; there is not much left to be said.

However, owing to the peculiar conditions governing the operations of the Chicago & Alton Railroad, we have classified car delays under two general heads, namely: In trains between terminals; and, in terminals and at stations.

The density and the character of the traffic on the Alton, together with the operating disadvantages resulting from train delays, are incentives enough to those in direct charge of train movements, to avoid delays, and this works to the advantage of car movement while cars are in trains between terminals.

But when it comes to yard movement these incentives are in a measure lost, and it is here that we have found a heavy drag upon the operations of the property. Therefore, to the elimination of delays in yards we have devoted our energies very diligently; and while we have found many discouraging and almost insurmountable obstacles opposing our efforts, we are satisfied that the impelling principles are correct, and that our efforts will finally be reflected in the net results of operation.

On the Alton, terminal delays have been classified as follows:

(a) Those due to lack of adequate yard facilities.
(b) Those due to lack of practical means to enforce economies.
(c) Those due to bad order situation.
(d) Disposition of foreign cars.
(e) Unloading of commercial traffic.
(f) Handling of company material.

(a) So far as yard facilities are concerned, our disabilities have long been recognized, but as improvement was possible only through expansion involving very large expenditures at all of our important terminals, the matter was postponed from year to year until further postponement could not be considered. At all of our principal terminals—Chicago, St. Louis, Kansas City, Springfield, Bloomington, Roodhouse, Slater—extensive improvements, aggregating in cost approximately $1,500,000, have been arranged for, many of which will come into operation within the next month or two. With restricted yard facilities, the reduction of terminal delays on the Alton has been uphill work. Nevertheless, we have employed every available means to facilitate the movement of freight cars through yards. Switch engine mileage has been increased—as much as 39 per cent. in May, 1913—and many experiences practicable under our restricted conditions have been employed. The results are beginning to show as may be noted from the following table:

	Average mileage per car per day—all cars.	
	1912.	1913.
January	19.21	21.71
February	19.92	21.44
March	23.03	23.23
April	18.85	25.33
May	19.97	25.07
June	22.69	24.48
July	23.17	25.61

(b) In congested yards where additional switching crews cannot be employed to advantage it is almost out of the question to consider any of the finer points of operation, in view of the pressing necessity for moving loaded cars without delay; whereas, with adequate facilities, a better classification and more orderly conduct of business are possible, with a smaller number of switching crews.

(c) One of our greatest difficulties has been due to the rapid increase in the number of bad order cars; and for some time past we have been specializing on this feature, believing that a car shortage will prevail this fall and winter, and realizing that every idle car represents so much unremunerative capital and lost traffic, and seriously impedes the conduct of business. To relieve the situation, the Alton has spent for freight car repairs during the fiscal year ended June 30, 1913, $1,405,209. This is $458,334 in excess of normal maintenance, and represents deferred maintenance charged out in operating expenses during the period stated. This is a part of a comprehensive plan to reduce the bad order situation on the Alton, an appropriation of $1,715,157 having been made for maintenance of equipment (including all classes of equipment), substantially one-half of which was spent in the first year. We have sent to outside repair shops several hundred bad order cars requiring heavy repairs, and have also inaugurated a system for making light repairs to freight car equipment in yards, avoiding the necessity of switching to repair tracks. Clearing up the bad order situation on the Alton will be a great relief. It is like getting rid of a cancer.

(d) Owing to the fact that the Alton is an originating road with but a limited supply of system cars at its disposal, the handling of foreign equipment is a live question at all times. Necessarily, under these conditions, car balances stand against the Alton, and it is urgently necessary to handle foreign cars expeditiously in order to avoid excessive car hire charges. Therefore, all matters pertaining to such equipment are handled by wire. If a foreign car cannot be loaded home without delay, it is ordered home immediately, and an open record of each individual car is maintained in the car service department, each car being under constant surveillance until delivery is effected to the proper connection. The first lot of 2,900 new freight cars has been received, and it is expected that this new equipment will enable us to clear foreign cars more promptly.

(e) The handling of house, team-track and other cars in revenue service is checked up closely. Consignees are notified promptly by telephone upon the arrival of carload shipments, the usual postal notice following. Recently, in addition to the regular demurrage charges, we have inaugurated a charge of $1 per day after the first forty-eight hours free time, and $2 per day after the expiration of ninety-six hours, for team-track storage, this charge applying at all stations on the Alton road. In addition to the strict enforcement of demurrage and storage rules, direct personal appeal is made to shippers and consignees to impress upon them the mutual advantages in releasing cars promptly.

(f) The handling of company material is a cause of con-

siderable delay to cars, but this matter, likewise, is followed up closely. Copies of manifests covering shipments of company material handled by the stores department are sent by the first train to the car service department; tracers are sent out immediately with instructions to release cars promptly; and the matter is kept in open file and followed up closely until cars are released and returned to revenue service. Such reports show the time of arrival and the time of unloading, together with other information necessary, and delay in unloading after the arrival of a car at destination is promptly and definitely located. Assistant engineers, supervisors, trainmasters, etc., are required to give loading and unloading of company material their personal supervision. Each week the situation is rounded up and my office is furnished with a statement complete in detail, showing cars on hand under load of company material, date received, lading, to whom consigned, etc., and unusual detentions are taken up with heads of departments.

While it is our desire to restrict the handling of company material to system cars, foreign cars frequently get into this service, but as a rule they are released promptly. Delays to foreign cars appearing on the weekly "On-hand" reports are handled vigorously. In fact, the movement of all cars in company service is watched critically, on the theory that they are worth too much in revenue service to warrant any delay whatever in handling company materials.

Aside from these specific causes of delay, the less important details of car movement are constantly being checked up. For instance, a general check of yards is made daily by local forces and periodically by the car service department which is held strictly accountable for per diem balances. In the periodical checks made under the supervision of the car service department, the arrival records are checked against the outbound movement to ascertain the average detention in yards, which is used for comparative purposes, and the list of cars on hand is scrutinized critically. In our periodical checks, the feature watched most carefully is the handling of foreign cars to connections, unusual delays being rigidly investigated.

Trainmasters are also required to make periodical checks of yards. At each yard, bills for loaded and empty cars are stamped with the time of arrival, and the yardmaster is held personally responsible for checking these cards twice a day, with a view to avoiding unnecessary delay.

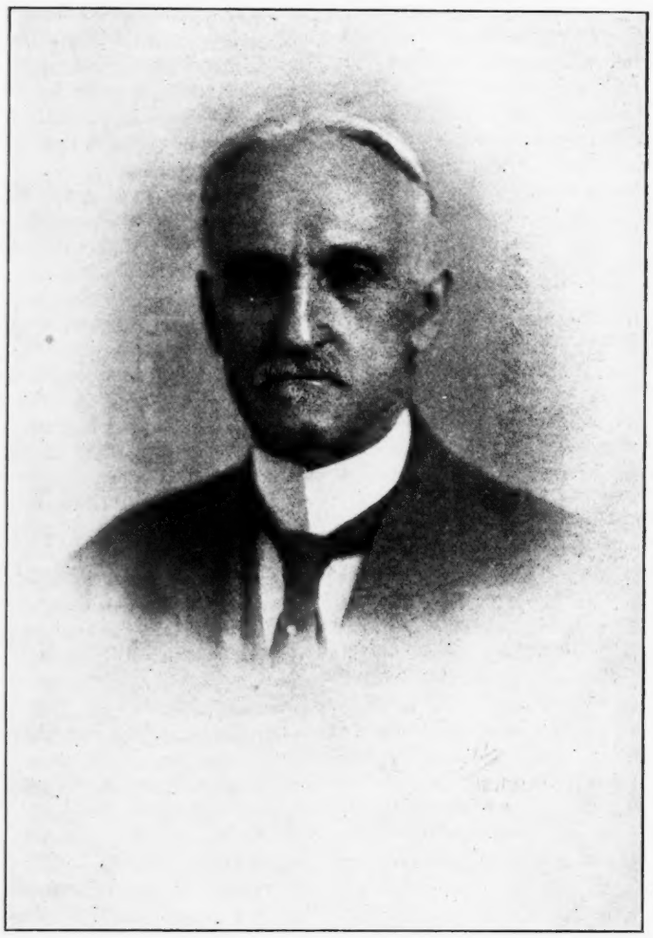
Repair tracks, also, are checked, not only by the car department, but also the car service department, the latter department receiving copies of all orders for material and undertaking to see that there is no delay in furnishing such material, in repairing the cars, and returning them to revenue service.

Bad order cars on the line are handled in the same manner, the car service department maintaining an open record and a close check upon individual cars until repairs are made and cars returned to service.

Inasmuch as directly or indirectly all the functions of a railroad organization are exercised in the interest of freight revenue, and as the equipment provided for freight traffic amounts to a very substantial part of the total capital investment in any railroad property, the activity of freight cars in service assumes a significant aspect; it is a reliable index to efficiency in the most important functions of a railroad; and, while on the Alton, we have been laboring under physical difficulties, the results attending our efforts are highly encouraging. With the improvements and added facilities now coming into service, we expect an improvement in average miles per car per day.

WILLIAM P. CLOUGH.

William P. Clough is to be made chairman of the board of the Northern Pacific, on the resignation of Howard Elliott as president and the creation of this new office.



W. P. Clough.

The creation of this office and the election of Mr. Clough to it are rather a concrete expression of the appreciation of the Northern Pacific directors for the responsibility and executive work which Mr. Clough has been doing for the past 12 years than any radical change in these duties.

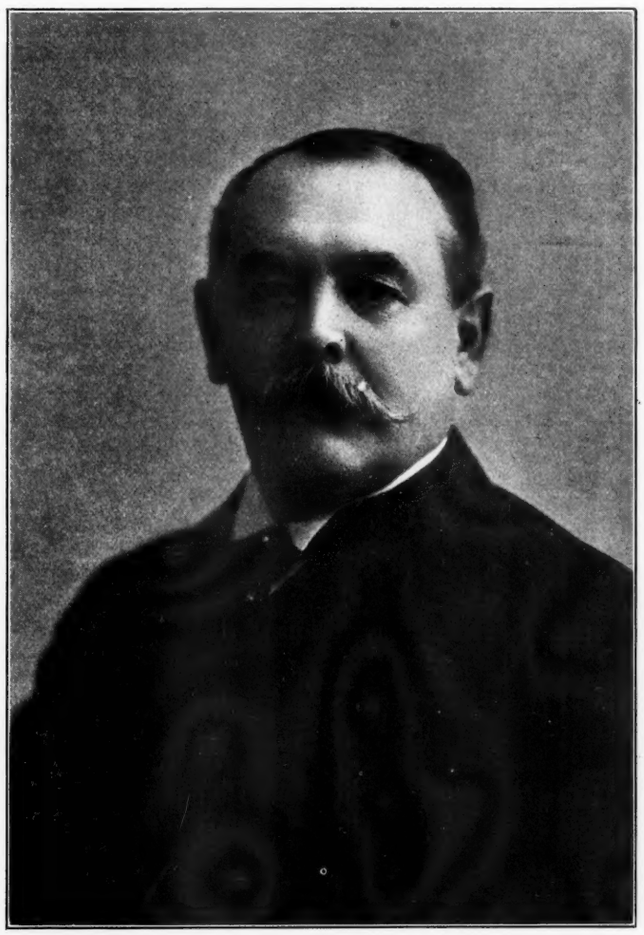
William P. Clough was born in Cortland county, New York, and began railway work on October 1, 1880, as general counsel in the west for the Northern Pacific; occupying that position until June 1, 1887, when he entered the executive department of the St. Paul, Minneapolis & Manitoba as assistant to the president, soon after becoming a director and the second vice-president of that company.

February 1, 1890, when the St. Paul, Minneapolis & Manitoba was taken over by the Great Northern, he became a director and the first vice-president of the latter company, and remained in those positions until the summer of 1901, when he resigned them to become a director of the Chicago, Burlington & Quincy, and a director and a member of the executive committee of the Northern Pacific, which positions he has continued to hold, and which, for the past twelve years, have chiefly occupied his time. On July 1, 1912, he became first vice-president of the Northern Pacific.

Railway Construction in Japan.—The Imperial Japanese Bureau of Railways announces that construction work on 39 lines will be carried out during the fiscal years ending March 31, 1914, and March 31, 1915, during which 285 miles and 169 miles, respectively, of new lines will be opened for traffic. The total railroad mileage to be completed in Kyushu is 94 miles. The important Miyazaki line to be extended 28 miles will open up a vast forest country, and its extension will give a great impetus to the timber industry in Kyushu. The Sendai line from Kagoshima to Kushikino is being built to serve the new large gold mine at Kushikino.

J. M. HANNAFORD.

Jule M. Hannaford, second vice-president of the Northern Pacific, has been recommended by the executive committee for election as president, to succeed Howard Elliott, as announced in a recent issue. The election of Mr. Hannaford will be a well deserved recognition of over 41 years of consecutive and faithful service on the Northern Pacific, since he became connected with the road in 1872 as chief clerk in the general freight office at St. Paul. For many years he has been reputed one of the ablest traffic officials in the country. It also represents another conspicuous example of the policy of promoting traffic men to railway presidencies, for Mr. Hannaford's entire railway experience has been in the traffic department, of which he has been in charge since 1899 successively as third vice-president and second vice-president, and previously as traffic manager. His railway service was begun in 1866 as a clerk in the general freight office of the Central Vermont at St. Albans, Vt., where he remained until he went with the Northern Pacific in 1872. In his first position with the latter road he is said to have compiled and written with a pen the first regular distance tariff of freight rates ever published on the Northern Pacific, and the original now hangs in his office at St. Paul.



J. M. Hannaford.

He is one of the most democratic and approachable of men, and his election as president will be especially acceptable to the shippers with whom he has been so long associated, and among whom he is exceptionally popular, as he bears an enviable reputation for willingness to hear both sides before reaching a decision and to co-operate with the patrons of the road for the best interests of all concerned. Mr. Hannaford is also remarkably popular with his subordinates and employees of the company, which is attributed not only to his kindly and pleasing personality, but also to the fact that he never forgets an old friend, and has in many ways been especially appreciative of loyal and faithful service on the part of his subordinates.

He was born November 19, 1850, at Claremont, N. H., and from June, 1866, to May 11, 1872, was clerk in the general freight office of the Vermont Central. On May 17, 1872, he became chief clerk in the general freight office of the Northern Pacific, and on May 1, 1879, was promoted to assistant general freight and passenger agent. From May 1, 1881, to August 1, 1883, he was general freight agent of the Eastern division, and from August 1, 1883, to March 1, 1884, assistant superintendent of freight traffic. He was then for two years general freight agent of the main line and branches, for four years traffic manager, and from 1890 to 1899, general traffic manager. From 1893 to 1893 he was also general traffic manager of the Wisconsin Central lines during their lease to the Northern Pacific. On February 1, 1899, he was elected third vice-president, and on April 1, 1902, second vice-president. From June 1, 1895, to June 28, 1906, he was also vice-president and general superintendent of the Northern Pacific Express Company, and since June 28, 1906, he has been president of that company.

THE SAYINGS OF STUBBS.

Former Governor Stubbs of Kansas is making a tour of Europe. He is a very active creature, is Stubbs, and he seems to have gathered more misinformation than do most politicians on such a voyage. The rivers and canals of Germany fill him with delight, and he demands that Uncle Sam buy a similar set of hand-picked waterways at once.

"If the United States will develop its internal waterways system, even to a slight extent," writes Governor Stubbs, "the complaint of high freights will be no longer heard. . . . A New York to Chicago canal would pay for itself in five years."

The *Journal* believes that in this concept of a New York to Chicago canal, Mr. Stubbs has made a new record in absurdity. He has extended the limit. A magnificent natural waterway reaches from Chicago to Buffalo—two-thirds of the distance to New York. Why abandon the lakes for a canal? For the rest of the route, the old Erie ditch is being deepened and widened; but the people of the empire state will be satisfied if this undertaking pays for itself in fifty years instead of five.

The Hon. Stubbs speaks of waterways as a cure for high freight rates. Twenty minutes' research would show him that railroad freight rates in Germany are almost twice as high as those in the United States. The average rate in Germany is 13 mills per ton-mile; in America it is about 7.6 mills. Nor can this be explained by saying that in Germany cheap and bulky commodities are shipped by water. The entire freightage of all the rivers in Germany for a year is less than the amount handled by the Pennsylvania Railroad system in two months.

If political journeymen would learn something about their own country before going abroad, they might be less ready to overwhelm the folks back home with advice—but such counsel as they did give would be better worth having.—*Chicago Daily Journal.*

Proposed Spanish Railway.—The project for the line from Pamplona to Logrono via Estella has been approved by the Ministerio de Fomento. The concession for construction is to be advertised in the near future and awarded this autumn so that work may begin early in the spring of 1914. Government engineers are examining the land necessary for the construction of a railway from Soria to Castejon.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.

Car Efficiency and Train Movement, Interchange Rules and Handling of Explosives Discussed at Chicago Convention.

The twenty-second annual convention of the American Association of Railroad Superintendents was held at the Hotel Sherman, Chicago, on Thursday and Friday, August 21 and 22. President Charles Burlingame, superintendent of the Wiggins Ferry Company, St. Louis, presided.

The morning session was devoted to preliminary business in connection with the organization of the association, discussion of subjects to be referred to committees for report at next year's convention and the report of the executive committee. It was decided to refer to the committee on transportation the subjects of proper marking, packing and stowing of freight, and identification of men in train and yard service; to the committee on interchange car inspection the subject of uniform car lettering, and to the executive committee the subject of allowing time and expenses to men attending the convention of the Train Despatchers' Association. The association last year referred to the American Railway Association a recommendation that that body recommend to the railways that train despatchers be allowed time and expenses for this purpose, but it appeared that no action had been taken. J. F. Mackie, secretary-editor of the Train Despatchers' Association, stated that several roads, including the Boston & Maine, New York, New Haven & Hartford, Atchison, Topeka & Santa Fe, Southern, Chesapeake & Ohio and Norfolk & Western, had allowed either time or expenses or both. The Boston & Maine had allowed the men $5 a day for expenses, but had required them to take the time out of their vacations. The executive committee will follow up last year's recommendation.

The subject of overhead inspection of box cars was referred to the interchange committee for consideration during next year. There was a long discussion on the question of making general yardmasters eligible to membership in the association. President Burlingame said that the yardmasters have no association of their own and that they could offer very valuable suggestions, increasing the attendance at and interest in the meetings, and perhaps representing superintendents who could not attend themselves. It was decided to refer this subject to the executive committee for a report at next year's meeting.

E. H. DEGROOT'S ADDRESS.

E. H. DeGroot, Jr., superintendent of transportation of the Chicago & Eastern Illinois, and past-president of the association, addressed the convention informally. He said that in order to increase the attendance at the conventions it was necessary that superior officers instruct the superintendents to attend as they are so burdened with details that they cannot get away from their work unless it is made part of their duty. The association has been passing through a critical period but he believed it has a brilliant future before it. The superintendents, with their experience and familiarity with the practical details of operation, are the men to solve the important and complex operating problems of the day. They must be interested in the work of the association, and the general managers must be interested sufficiently to instruct them to attend. Referring to the discussion on the overhead inspection of box cars, he said that any man who doubts the importance of the subject has only to walk through the cars in his local yards and observe their condition, and to note the loss and damage claims, to be convinced that it is one of the most important subjects the association could consider. Regarding the admission of general yardmasters, he thought it would be very fitting if either the general superintendent, superintendent or yardmaster might represent his company at the conventions. The question of rank or dignity should not be considered. The yardmasters are thoroughly conversant with many details of operation that can make or break the superintendent.

Mr. DeGroot urged the association to give most careful attention to the subject of obtaining greater efficiency in the use of freight cars. No one has more to do with car efficiency than the superintendent, but he is the hardest man to convince that his own car movement is not the best on earth. Cars make 25 to 26 miles per day on the average. The intermediate lines handling freight for long distances tend to bring up the average and originating a short haul lines tend to bring it down. The movement of cars in trains can hardly be greatly improved; incerased efficiency must come in the handling at terminals. If cars on interchange track are "pulled" but once a day, cars are delayed, there is a delay in switching them to the repair track, the forwarding track or to an industry, and cars are also subject to delay awaiting movement or during their detention by consignees or shippers. If each superintendent can be convinced that his own cars are not moving fast enough much will have been done to avert car shortages and reduce car hire bills. There are some things that cannot be avoided, but frequently eight or nine days are consumed at local stations because proper arrangements are not made for preventing delays or if made are not carried out.

A vote of thanks was tendered Mr. DeGroot for his address.

Mr. Burlingame supplemented his remarks on car efficiency, saying that there is no economy in unduly reducing forces at terminals and that there are many incidental advantages in having adequate forces, such as the prevention of fires and theft, and reduction of per diem charges. The subject of improving movement of cars at terminals was referred to the transportation committee.

E. H. Harman, secretary and treasurer, reported that the membership had been increased from 74 last year to 159 as the result of a campaign to increase interest in the work of the association. A circular describing the objects of the association, and giving a copy of the constitution and by-laws and the printed proceedings had been sent to every operating official in North America, and an effort had been made to establish local divisions of the association at all important terminal points.

T. B. Fogg, general manager Toledo Terminal, presented the report of the executive committee, recommending the appointment of an auditing committee and an arbitration committee to arbitrate such cases as may be referred to it by the local divisions. The committee also recommended that the next convention be held during the latter part of May instead of in August. The association voted to adopt the recommendations providing for the new committees and to hold the convention on the third Thursday and Friday of May, the place of meeting to be decided by the executive committee. The executive committee will also take up with the general managers' associations the question of obtaining better recognition of the association so that superintendents may be instructed to attend the meetings. The committee was also instructed to make provision in the by-laws for honorary membership in the association to include past-presidents.

ADDRESS BY COL. B. W. DUNN.

At the afternoon session Col. B. W. Dunn, chief inspector of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, gave an informal talk on the handling of explosives, inflammables and acids, illustrated by a series of motion pictures which have just been made for the bureau with the assistance of the educational bureau of the Union Pacific, for the purpose of showing proper and improper methods. Col. Dunn explained that the pictures had been worked up as an experiment to take the place of or supplement the present lectures with stereopticon views which have been given by inspectors of the bureau before railway men all over the country. The motion picture film includes printed explanations of the various pictures

so that it may be used without a lecture, and includes views showing proper and improper methods of storing and loading explosives, the rejection of a box of high explosives by an agent on account of its leaky condition, the proper manner of inspecting packages and shipping orders, bracing a package in a car, the use of the various placards, labels and stamps required to be used on cars, packages and waybills, proper method of handling a leaky shipment of dynamite—placing it in a larger box and packing with sawdust—sending a telegram asking a bureau inspector to come and destroy the package, the methods followed by the inspector in destroying it, and the burning dynamite. One picture shows a freight handler trucking a leaky barrel of gasolene into a box car, lighting a cigarette while in the car, and the resulting explosion, the man being carried out dead. Another shows the proper method of bracing carboys of acids in a car, sprinkling ashes or sand around the base to absorb leakage.

The Union Pacific has provided its instruction car with a set of these pictures, and has been showing them to 30 to 40 men a day for the past month and it is proposed to have all roads maintaining such cars use them in the same way. The films shown will be used on the Illinois Central.

Col. Dunn described briefly the work of the bureau, showing that the loss and damage caused by accidents in the handling of explosives and similar articles had been reduced from $500,000 in 1907 to about $10,000 in 1912 and the number of lives lost from 50 to none. He appealed especially to the superintendents to cooperate with the work of the bureau by educating their employees and by following up the reports of inspectors in order to apply the necessary remedies. He said that the source of the greatest danger today is rough handling of cars containing dangerous articles, and that hardly a week passes that a report does not reach his office of contents of cars damaged by rough treatment. These reports are all referred to the general managers for investigation, but he has never yet received any other than that "on our line this car was handled with extreme care." The good record of last year is likely to go by the board at any time because of some accident caused by rough handling in spite of all the care that is being exercised generally. About 5,000 cars of dangerous articles are transported daily, and every time a package is broken there is great danger of a very serious disaster. He wanted to hear from the superintendents as to what could be done to prevent rough handling, and suggested that possibly a device could be perfected to be installed in cars that would record instances of severe shocks so that they could be located and discipline administered.

Discussion.—The address aroused a lively discussion of the subject of rough handling. Several superintendents thought that under present conditions it was impossible to obtain "softer" switching of cars, and that dependence for safe handling would have to be placed on the containers in which dangerous articles are packed. Several thought the expense of the additional precautions required in the handling of such articles should be borne to a greater extent by the shippers, as being out of proportion to the rates received. Col. Dunn explained that the double first class rates charged for such articles is greater than the revenue received from other articles to compensate for the additional expense of safeguarding their handling, the average cost of bracing being about $2.06 per car, and that the manufacturers of explosives have shown a praiseworthy spirit of cooperation in making their packages safer. Several superintendents thought that a strong metal container and a cushion packing might obviate the necessity of such strict regulations as to the condition of cars, to which Col. Dunn replied that no packing would be safe in a car in a condition to admit sparks and set the car or its other contents on fire, and that there were many practical difficulties involved in the distribution of cushions.

M. Marea, general superintendent St. Louis, Troy & Eastern, expressed the opinion that explosives should not be stowed in the car ends, where there is danger of accident during repairing of draft rigging, and thought that some kind of cushion might be devised to be placed between the load and the car end. J. M. Walsh, superintendent Illinois Central, said that the rules against allowing engines or cars to strike a train containing explosives should be more strictly enforced.

President Burlingame thought that explosives are given special handling in most large yards, as in the case of perishable articles, and that most of the rough handling is during the line haul. He did not see how the shocks of transportation could be materially reduced with the large cars, especially as, with automatic couplers the switchmen are not so careful as in the days of the link and pin. Mr. DeGroot emphasized Col. Dunn's remarks about the necessity of interesting the superintendent, saying that little improvement can be obtained unless the superintendent is convinced of its necessity, but that if he is interested he is in a position to exert a multiplicity of influence through his organzation. The solution of the rough handling problem, he thought, is greater supervision.

It was decided to refer the subject to the committee on transportation for a report at the next meeting.

REVISION OF TRAIN RULES.

J. E. Scott, despatcher of the Gulf, Colorado & Santa Fe at Cleburne, Tex., presented a report of the joint committee on train rules of the American Association of Railroad Superintendents and the Train Despatchers' Association, which consisted of a number of amendments and additions to the joint report of recommendations and suggestions as to revising the Standard Code of Train Rules and Forms of orders previously approved by the two associations and submitted to the American Railway Association under date of February 20, 1913. The original report consisted of a pamphlet of 23 pages. The report as adopted after a lengthy and interesting discussion includes the following:

Rule 14. A new signal is added, 000——, flagman go forward and protect train. In a note the committee says: "There seems to be a necessity for a whistle signal of this kind, especially in automatic block territory. The signal we have suggested for this is 14 (c) reversed and we recommend the signal 00 00 instead of what we have heretofore recommended for 14 (q). We also suggest that a certain standard duration for long and short whistle signals, respectively, be prescribed, say 2 seconds for short, 4 seconds for long and 8 seconds for approaching stations, junctions, etc.

"We also suggest that railways generally be recommended to arrange with each other at intersecting points, whistle signals for calling in flagmen of a character similar to what we have recommended for intraroad points in 14 (d), (e), (f) and (g). It is our belief that a standard code satisfactory to the Interstate Commission—should such a code be made obligatory by law—would require such provision. We suggest that the junior line signal be given twice, with the briefest possible interval between the calls."

Rule 27. It is suggested that the rule be modified to require switch lights found extinguished to be relighted.

Rule 86B, first paragraph, is amended to read: "An inferior train must clear the time of a first class train or a passenger extra train, Form 'G,' Example (3), in the same direction, at the station where clearance is made, not less than 10 minutes, or must be clear of the main track by the time such first class or extra train is due to leave the last station in the rear where time is shown. Failing to clear the main track by the time required, it must be protected as prescribed by Rule 99. (See Rules 92 (A) and 87.)"

Rule 104. A paragraph is added as follows: "A switch must not be closed until the train taking the siding has fully cleared the fouling point."

Rule 201. "Being of the opinion that the person authorized to issue orders or instructions should be authorized to do so over his own signature, we suggest that train orders should be signed by the train despatcher issuing them." Also add to first paragraph: "Instructions affecting trains, of other character than as illustrated in 'Forms of Orders' must not be issued on Train Order forms." "Note.—We suggest the 'Pink Bulletin,' as used on numerous lines, or some similar form, for the purpose of issuing other telegraph (or telephone) instructions." Second paragraph, Standard Code. It is suggested that this be changed to read: "They must be in the prescribed forms when applicable; and without erasure, alteration or interlineation. When not in a prescribed form, they must be brief and clear." "Note.—It seems evident that this injunction to be 'brief and clear' refers to forms created by the despatcher, since the use of the prescribed forms when applicable leaves no discretion as to either brevity or clearness. We have found much confusion of thought to exist on this point."

Rule 204. The words requiring station operators to retain and preserve a copy of train orders are eliminated.

Rule 206 is amended to read: "Regular trains will be designated in train orders by their numbers as 'No. 1,' '2nd No. 1,' or 'Nos. 1 and 3,' adding

engine numbers if desired *for identification. When more than one engine on a train, only one need be designated.*" "Note.—We are strongly impressed with the great desirability, in the interest of safety, of train identification signals. We know of several recent hazards caused by their absence."

Rules 210 and 211. Amended to require operator in listening to repetition of train order, to underscore his office copy, to increase assurance that he actually listens to the repetition as required.

Rule 221A and 221B. Insert. "When a train has been cleared and afterwards orders are issued to it, the original clearance card must be surrendered and a new one issued with the orders."

Rule 299. "New Rule. Insert immediately after 'Forms of Train Orders' striking out present paragraph: 'All of these forms and examples may be used in combination, with such changes in wording as conform to the principle involved. They may be used for two or more first or second designated trains, and for consecutive movements as illustrated by examples (2), 'form A.' "

An alternate Form F and rules to provide for yellow signals on first and intermediate sections and green signals on last sections, is amended to provide that no signals shall be used for one train on a schedule and that white signals shall be used for extra trains.

Wherever in the original report the 15 train order is specified the pink bulletin as suggested in Rule 201 is to be understood.

Many of these and other changes suggested were for the purpose of making the rules more specific in various technicalities to avoid misunderstandings that have sometimes developed in practice.

Discussion.—The discussion on the train rules report was continued at the morning session on Friday. Those present were greatly interested in the recommendation that train despatchers should use their own signatures instead of those of the superintendents. Mr. Fogg said that this has been put into practice on his road. Mr. DeGroot said that it would be an important step in the development of the train despatcher, and that if a man is given responsibility he should be given the necessary authority in black and white.

Considerable importance was also attached to the change in Rule 201, providing that incidental instructions affecting trains shall not be issued on train order forms. Mr. DeGroot described the system of pink bulletins used on the Chicago & Eastern Illinois, which are also used on the Rock Island, Pennsylvania and other roads. The chief participants in the discussion on train rules included J. F. Mackie, secretary-editor of the Train Despatchers' Association, and J. P. Finan, despatcher of the Atchison, Topeka & Santa Fe, at Needles, Cal.

INTERCHANGE CAR INSPECTION.

The following report of the committee on interchange car inspection was presented by M. Marea, chairman:

"After due deliberation, it is the general opinion on the subject of Visible Load Transfer, taking into consideration the modification of the American Railway Association Rule 15 so that the cost of transfer will not be charged against delivering company unless the physical defects cannot be repaired under load, that this association should submit to the American Railway Association the proposition of defining exactly what shall constitute a delivering line's liability.

"The St. Louis division of this association has defined that a combination of defects must exist before the delivering line shall be responsible for the transfer, for the reason that many receiving railroads say they have not the facilities to make certain repairs under load, while the delivering line may have the facilities.

"Under the present Master Car Builders' Rules an injustice is often done the line maintaining ample facilities for making repairs, because there is a chance to err as to who is liable for the transfer, when there is a difference in the repair facilities of the lines involved.

"Your committee wishes also to call attention to the following tabulated statement showing transfer claims handled in the first six months of 1911 under the twenty-four hour clause in the St. Louis territory, as compared with similar claims handled the first six months 1913 under the combination clause:

Transfer Claims Handled First Six Months of 1911 Under Twenty-four Hour Clause.

	Claims.	Cards.	Cuts.
January	1,109	820	289
February	966	599	367
March	1,144	698	446
April	897	680	217
May	1,310	1,146	164
June	1,373	1,204	169
Total	6,799	5,147	1,652

Transfer Claims Handled First Six Months of 1913 Under Combination Clause.

	Claims.	Cards.	Cuts.
January	333	230	103
February	232	131	101
March	356	280	76
April	292	203	89
May	436	289	147
June	428	256	172
Total	2,077	1,389	688

"You can readily see the difference; it plainly shows that the twenty-four hour clause is a bad arrangement and that it will eventually breed discontent at any large interchange point.

"Your committee will not at this time make other recommendations in regards to interchange car inspection, owing to changes in the Master Car Builders' rules which go into effect September 1, 1913, and recent changes in Master Car Builders' rules 120 to 131 which went into effect August 1, 1913. The changes in these rules it is expected will bring a great benefit to all railroads, by facilitating the movement of cars unfit for lading to the home line. After the new rules have been in operation for a reasonable period your committee may have some further changes to recommend."

Minority reports were submitted by J. E. Mechling, master mechanic of the Vandalia and H. Boutet, chief interchange inspector of the Cincinnati Interchange Car Inspection Bureau.

Discussion.—After discussion a resolution was adopted recommending that the American Railway Association change Car Service Rule 15 to provide that the delivering line shall not be billed for the cost of transfer, except under a combination of defects as defined in the M. C. B. Rules. Several of those present were in favor of abolishing inspection except for safety, and including the cost of repairs except for owner's defects in the per diem charge. Mr. Burlingame said that the St. Louis lines had already recommended this on the ground that 14 cents of the per diem rate actually covers the cost of repairs.

At the concluding session on Friday afternoon W. W. Wheatley of New York presented a paper on "Railway Economics."

C. B. Schmidt, commissioner of immigration, Rock Island Lines, presented a paper on "Immigration and Western Development Work."

MR. SCHMIDT'S PAPER.

Mr. Schmidt traced the history of emigration from the earliest times, describing particularly the methods by which the first western railways created a population in their newly opened territory, and the changing character of immigration in recent years.

"An immigration official, to be successful," he said, "must familiarize himself, not only with the character, resources and opportunities of the territory to which immigration is to be directed, but also with the general economic conditions in all those parts of the world from which immigration may be drawn. He must be sufficiently intelligent and experienced to inspire the homeseeker with confidence in his judgment and integrity. Wilful misrepresentation or faulty judgment in giving advice, will soon destroy his usefulness. And it is in this respect that the field officers of the railroad company, the general and division superintendents and their assistants can be of inestimable help to the immigration department. The operating department official has a constant opportunity to familiarize himself with the character of the lands and colonization opportunities along his division."

Mr. Schmidt opposed vigorously the present tendency in certain quarters to consider immigration a menace rather than a benefit, as a result of which restrictive legislation is constantly urged upon congress, chiefly in the pretended interest of organized labor. He declared that foreign labor does not reduce wage scales but stimulates industry and enables the native worker who despises menial labor to secure for himself higher employment at more remunerative wages.

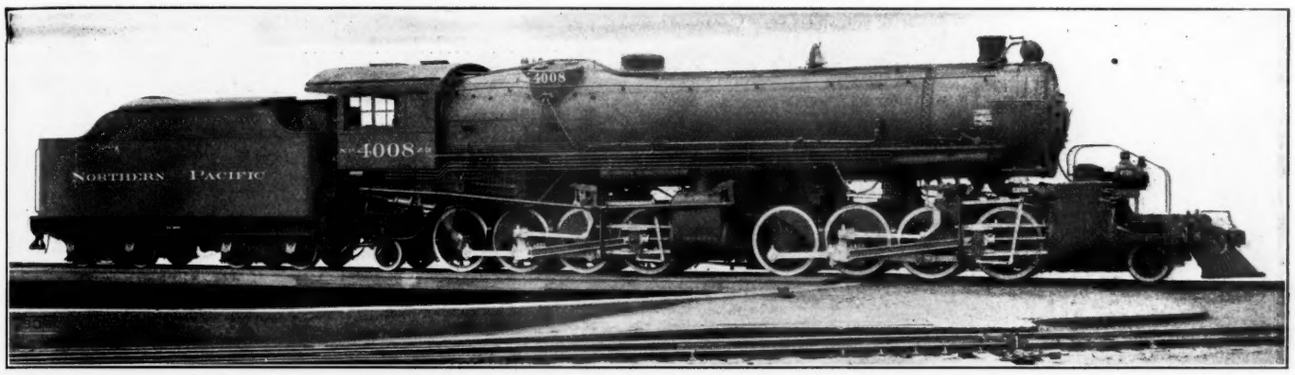
"The time has not yet arrived," he added, "when we should exclude from our country the surplus human force—brain, brawn and muscle of old Europe, on flimsy pretexts, such, for instance, as the proposed literacy test, which fortunately was successfully vetoed by President Taft, but is now being brought forward again under the chaperonage of Senator Dillingham in a new guise. We are not getting at present a foreign immigration too large for the country to digest. If the Dillingham bill should become law, it would mean the exclusion annually of about 200,000 able bodied immigrants, who come to us to employ their muscle and brawn in hard labor to produce values. Railroad officials of all grades and in all departments should interest themselves in immigration and give to the immigration official all possible aid and to the immigrant—native or foreign, their sympathy. The railroad superintendent especially is in position to aid the immigraton officials in their work of getting the homeseeker properly located."

The following officers were re-elected for the ensuing year: President, Charles Burlingame, superintendent Wiggins Ferry Company, St. Louis; vice-president, H. R. Saunders, terminal superintendent, Chicago, Rock Island & Pacific, Kansas City; secretary-treasurer, E. H. Harman, Terminal Railroad Association, St. Louis.

NEW LINE FOR THE BALEARIC ISLANDS.—The concession for a strategetic railway from Palma to Santany, Balearic Islands, has been awarded to the Compania de Ferrocarriles de Mallorca, Mallorca, Balearic Islands, Spain.

HEAVY POWER FOR THE NORTHERN PACIFIC.

The Northern Pacific has the distinction of employing a larger number of Mikado type locomotives than any other road in the country. The first order of this type consisted of 25 locomotives of which six were tandem compound were built by the American Locomotive Company in 1904. These were almost the pioneers of the type in this country, so far as modern heavy power is concerned, and are simple engines having 24 in. x 30 in. cylinders, 63 in. driving wheels, 200 lbs. steam pressure and have a total weight on drivers of 196,000 lbs. The tractive effort is 46,630 lbs. At that time these locomotives were the heaviest on that road and among the heaviest in the country. Since 1904 various improved designs have been developed from the original engines until at present the Northern Pacific has in operation 470 locomotives of the 2-8-2 type built by the American Locomotive Company.



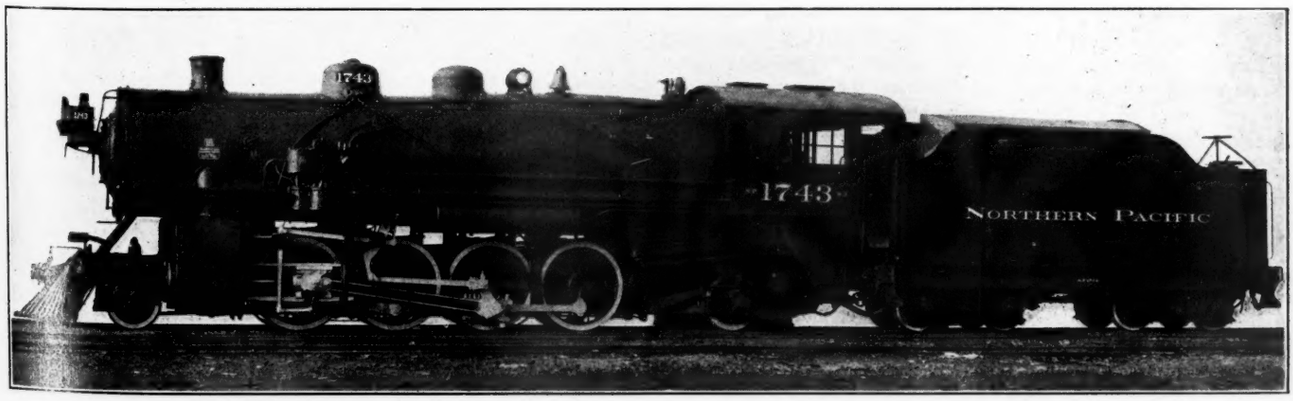
Powerful Articulated Pusher Locomotive; Northern Pacific.

The latest addition to this equipment is 50 locomotives having 28 in. x 30 in. cylinders, 63 in. driving wheels, 180 lbs. steam pressure and a tractive effort of 57,400 lbs. The total weight on drivers is 240,500 lbs. While the first engines did not have combustion chambers, an order which followed shortly after was so provided, the design being prepared by David Van Alstyne, then superintendent of motive power. The various orders which have followed have in each case had a combustion chamber and the later engines also have superheaters.

As part of the latest order, the American Locomotive Company has also delivered ten Mallet locomotives of the 2-8-8-2 type, which are a development of the previous design of articulated locomotive that has been very successfully used in helper service on this road.

That the new locomotives are proving to be all that could be expected is evident from the following description of the work they are doing on various divisions.

They have been put into service between Mandan, N. D., and



Latest Development of the 2-8-2 Type Locomotive on the Northern Pacific.

Paradise, Mont., including the Yellowstone, Montana and Rocky Mountain divisions. The Yellowstone division, Mandan, N. D., to Billings, Mont., is 441 miles long and has a maximum grade of one per cent. against both east and westbound traffic. The new Mikado locomotives (Class W 3) are hauling 1,800 tons over this district at an average speed of from eight to ten miles an hour.

On the Montana division, Billings, Mont., to Helena, Mont., a distance of 239 miles, there is a ruling grade westbound from Livingston to Muir, twelve miles long, of 1.8 per cent., and eastbound from Bozeman to Muir, thirteen miles long, of 1.9 per cent.; all grades are compensated. West of Bozeman the maximum grade is 0.8 per cent. against eastbound traffic. In this territory the Mikados are hauling 1,800 tons with a Class Z-1 Mallet helper between Bozeman and Muir. The Class Z-1 Mallet is a 2-6-6-2 type, having cylinders 20 in. and 31 in. x 30 in., saturated steam, 210 lbs. pressure, weight on drivers of 262,350 lbs., and a tractive effort of 58,100 lbs.

Previous to receiving the new Mikados, trains of 1,400 tons were hauled over this territory by a Class W (2-8-2 type) locomotive using the same helper. The Class W has cylinders 24 in. x 30 in., saturated steam at 200 lbs. pressure, weight on drivers of 203,000 lbs., and a tractive effort of 46,600 lbs.

These new locomotives have increased the train loads on this division by 28.6 per cent. and observations indicate a considerable saving in coal and water.

The Rocky Mountain division, from Helena, Mont., to Paradise, Mont., is 219 miles long. From Helena to Blossburg there is a maximum grade against eastbound traffic, seventeen miles long, of 2.2 per cent. The balance of the division has a grade against eastbound traffic from Missoula to Garrison, sixty-eight miles of .4 per cent., and from Garrison to Blossburg, thirty-one miles of 1.4 per cent.; all grades are compensated. One Class W-3 locomotive hauls 2,600 tons from Missoula to Garrison at an average speed of sixteen miles an hour. The Class W hauls 2,200 tons at an average speed of twelve miles an hour. Between Garrison and Blossburg one Class Z-1 helper is used. On this division the new Mikados are making 41,600 ton mile hours as against 26,400 for the Class W Mikados, an increase of 57.6 per cent.

Between Helena and Blossburg a Class W-3 locomotive with a Class Z-3 helper is hauling 1,750 tons with no increase in coal over that formerly used by a Class W and a Class Z-1 handling 1,350 tons. This is an increase of 29.6 per cent. in train load, with no increase in coal consumption.

The new Class Z-3 (Mallets) are used on the Rocky Mountain and Seattle divisions, four coal burners on the Rocky Mountain division and six oil burners on the Seattle division. The grades and trains on the Rocky Mountain division are described above, these locomotives being used as helpers between Helena and Blossburg.

The Seattle division, from Ellensburg, Wash., to Auburn, Wash., is 105 miles long, crossing the Cascade mountains through Stampede Tunnel west of Ellensburg at an elevation of 2,837 feet above sea level. These locomotives are handling 2,200 tons from Auburn to Ellensburg at a speed of from eight to fourteen miles per hour, on a total oil consumption of 2,645 gallons. From Auburn to Lester, a distance of 43 miles, the average grade is one per cent. From Lester to Easton, a distance of 24 miles, there is a ruling grade of 2.2 per cent. for ten miles. The Class Z Mallet helper above mentioned is used from Lester to Martin. Westbound, the Z-3 locomotive handles a time freight of 1,900 tons from Ellensburg to Auburn on 1,726 gallons of oil, having a Class Z Mallet helper on the 2.2 per cent. grade.

The design of the new 2-8-2 type locomotives combines a superheater, firebrick arch, smoke consumer tubes in the sides of the firebox and a 36 in. combustion chamber. Included in the design are the builders' latest design of valve stem guide, piston rod extension guide, outside steam pipes, power reverse gear, and outside bearing trailing truck.

Both the oil burning and coal burning Mallets have superheaters and power reverse gears; the four coal burning engines are equipped with an arch.

The general dimensions of both types are given in the following table:

	Mallet	Mikado
General Data.		
Type	Mallet	Mikado
Class	Z 3	W 3
Fuel	Bit. coal	Bit. coal
Tractive effort	87,600 lbs.	57,200 lbs.
Weight in working order	462,000 lbs.	320,000 lbs.
Weight on drivers	401,000 lbs.	240,500 lbs.
Weight on leading truck	34,000 lbs.	30,500 lbs.
Weight on trailing truck	27,000 lbs.	49,000 lbs.
Weight of engine and tender in working order	655,000 lbs.	513,900 lbs.
Wheel base, driving	15 ft.	16 ft. 6 in.
Wheel base, total	55 ft. 2 in.	35 ft. 3 in.
Wheel base, engine and tender	83 ft. 6¼ in.	68 ft. 2¼ in.
Ratios.		
Weight on drivers ÷ tractive effort	4.59	4.19
Total weight ÷ tractive effort	5.29	5.60
Tractive effort × diam. drivers ÷ evaporating heating surface	900.00	1,002.00
Total evaporating heating surface ÷ grate area	65.8	50.90
Weight on drivers ÷ total evaporating heating surface	72.30	67.00
Total weight ÷ total evaporating heating surface	83.20	89.00
Volume equiv. simple cylinders, cu. ft.	28.64	21.40
Total evaporating heating surface ÷ vol. cylinders	194.00	167.50
Grate area ÷ vol. cylinders	2.95	3.29
Cylinders.		
Kind	Compound	Simple
Diameter and stroke	26 in. & 40 in. x 30 in.	28 in. x 30 in.
Valves.		
Kind	H. P., Piston; L. P., Slide.	Piston
Diameter	H. P., 14 in.	16 in.
Greatest travel	6 in.	7 in.
Outside lap	1⅛ in.	1 1/16 in.
Inside clearance	H. P., ¼ in.; L. P., 1/16 in.	0 in.
Lead	H. P., ⅛ in.; L. P., 3/16 in.	⅛ in.
Wheels.		
Driving, diameter over tires	57 in.	63 in.
Driving journals, main, diameter and length	10½ in. x 12 in.	11½ in. x 14 in.
Driving journals, others, diameter and length	10 in. x 12 in.	10½ in. x 14 in.
Engine truck wheels, diameter	30½ in.	33½ in.
Engine truck, journals	7 in. x 13 in.	6½ in. x 12 in.
Trailing truck wheels, diameter	30½ in.	42 in.
Trailing truck, journals	7 in. x 13 in.	9 in. x 14 in.
Boiler.		
Style	E. W. T.	E. W. T.
Working pressure	200 lbs.	180 lbs.
Outside diameter of first ring	87⅛ in.	83 3/16 in.
Firebox, length and width	126 in. x 96¼ in.	120 in. x 84¼ in.
Tubes, number and outside diameter	262—2¼ in.	212—2¼ in.
Flues, number and outside diameter	43—5½ in.	40—5½ in.
Tubes, length	24 ft.	18 ft.
Combustion chamber, length	56 in.	36 in.
Heating surface, tubes	5,170 sq. ft.	3,266 sq. ft.
Heating surface, firebox	368 sq. ft.	325 sq. ft.
Heating surface, total	5,538 sq. ft.	3,591 sq. ft.
Superheater heating surface	1,249 sq. ft.	846 sq. ft.
Grate area	84.3 sq. ft.	70.4 sq. ft.
Smokestack, height above rail	190¾ in.	183 7/16 in.
Center of boiler above rail	123 in.	117 in.
Tender.		
Water capacity	10,000 gals.	10,000 gals.
Coal capacity	16 tons	16 tons

New Line for Abyssinia.—The concession for the construction of the last stretch of the Jibuti-Adis Ababa Railway, the length between the Haua river and Adis Ababa, has been finally granted to the Compagnie de Chemin de fer Franco-Ethiopien, which is now making all arrangements for pushing on with the line as soon as the rainy season is over, that is, in October. The railway will be completed in about two years and is expected very materially to assist in the commercial development of Abyssinia. Attention is drawn to the interest in the trade possibilities of the country being shown by French capitalists, who are displaying considerable activity in securing concessions of various descriptions. It is considered very probable that the near future will witness a large influx of Europeans into Abyssinia, for commercial and industrial possibilities are very promising. There are said to be very few signs of industrial enterprise at present, a few grain mills, two wood sawmills, a small cement works, and a government electrical station and cartridge factory representing the entire industrial plant.

PENNSYLVANIA PUBLIC SERVICE COMPANY LAW.

A New and Comprehensive Treatment of the Relation of Railroads, Gas Companies and Other Public Servants to the State.

The new law of the State of Pennsylvania for the regulation of railroads and other public service companies is Act 854 of the general assembly of this year, and was approved by the governor on July 26. It consists of six articles and the articles are divided into sections, making 117 sections in all. One of the articles consists of only a single section, but that is made up of 25 subsections. Most of the requirements of this law take effect January 1, 1914, but the commission appointed under it has already been organized. In every case, so far as possible, a section devoted to a given topic is made to apply to all public service companies; and sections applying to railroads and not to gas companies, etc., or to gas or electric companies and not to railroads, are comparatively few.

Article 1, Section 1, defines the term public service company. It includes railroads, telegraph and telephone companies and everything that is mentioned in the interstate commerce law, and also baggage transfer corporations, ferry corporations, tunnel corporations, turnpike corporations, incline plane corporations, gas, water, water-power, heat, refrigerating and sewage corporations, and all persons engaged for profit in the business contemplated by the law; and also municipal corporations to the extent that they carry on these kinds of business. The term railroad includes lines operated by any kind of power. The term street railway includes any line used for the public conveyance of passengers or property, being mainly or in part located on a street or highway. Steamboat lines, other than ferries, are not named in this enumeration; but there is a clause declaring that the term common carrier is to include persons or corporations conveying passengers or property for profit by water.

The term "service" is intended to be used in its broadest and most inclusive sense; and the definition of facilities contains a list of words filling half a page, including all kinds of cars and vehicles and vessels; cables, converters, cross arms, storage batteries, ducts, lamps, docks, gas jets, wells, and everything that could be thought of.

Article 2 defines the duties and liabilities of public service companies. These paragraphs, lettered from *a* to *y* inclusive, can be only partly abstracted in the space here available. It is the duty of such companies (a) to furnish adequate service; (b) to make reasonable rates; (c) to make repairs and improvements as may be necessary; (d) to file tariffs, showing all charges, conditions, etc., including the method of distribution of trains, cars, vehicles, boats and motive power. Tariffs are to correspond with those called for by the federal government where practicable. The commission may restrict the number of tariffs required to be posted.

(e) Joint tariffs are required, and the commission may prescribe the apportionment of rates between different carriers; (f) tariffs may be changed only on thirty days notice. A rate made by the commission may not be changed within three years without approval by the commission, made after application is filed, giving thirty days notice. (g) Copies of all contracts must be filed with the commission; (h) reports must be made and filed as required. (i) Records must be adopted and kept as required by the commission and in the forms prescribed. Included in the records must be a proper and reasonable depreciation account, if required by the commission, and this applies also to municipal corporations with respect to public services rendered by them of the kind contemplated by this law. (j) Companies must keep all suitable books, accounts, records and memoranda, in an office within the state of Pennsylvania, and not remove them out of the state without proper authority; but this does not apply to a public service company of another state engaged in interstate commerce, whose accounts are kept at its principal place of business in another state, in the manner prescribed by the Interstate Commerce Commission. (k) Maps, profiles, reports of engineers and other records must be furnished as called for. (l) Reports must be made to the commission when required, concerning the disposition of the proceeds of all sales of stocks, bonds, notes, etc. (m) Railroads and street railroads must furnish a reasonable number of safe trains, cars, boats, etc.; must operate these with such motive power as may reasonably be required; operate with sufficient frequency and change time schedules when reasonably required by the commission. (n) Railroad and other common carriers must furnish sufficient and suitable cars, boats, etc., to all shippers of freight; or, when the supply is inadequate, distribute without discrimination, in accordance with the rule of the Interstate Commerce Commission; but preference may always be given to live stock or perishable goods. (o) Lateral railroads and private sidings must be treated on reasonable terms and connecting tracks be made where the connection can be made and operated with safety, and the business will justify. If the owner of a private siding sells out to the railroad then all shippers must be treated alike at that side track; they may connect therewith upon payment of suitable compensation. (p) Telephone or telegraph corporations must provide reasonable through and continuous communication without unreasonable interruptions or delay. (q) Bills of lading must be issued and must show that the originating road is responsible through to destination; provision is made for suing connecting carriers for damage to shipments. (r) Street railways must make suitable connections with each other. (s) Railroads and street railways must make and maintain suitable connecting tracks, where practicable, and must transport freight without transfer or discrimination; but no such carrier shall be required to give the use of its tracks or terminal facilities to any other common carrier. It is provided that this subsection (s) shall not apply to a street railway not doing a freight business.

(t) The commission has full power to order the construction of tracks across the lines of other companies; to change grade crossings, elevating or depressing the grade; to require the stationing of watchmen at crossings; the installation of lights, signals, and safety appliances, and to say who shall pay the expense.

(u) Telegraph corporations must connect their lines for through traffic whenever the commission may require. (v) Telephone lines are subject to similar requirements, the intent of the law being to require efficient through service where it can be obtained without injustice to either company and without impairment of its service. Such connecting companies shall make among themselves an equitable apportionment of the cost and revenue. Paragraph *w* regulates the use of gas meters, water meters, etc. The companies must make provision for testing meters. (x) Accidents in which any person shall have been killed or injured, must be reported immediately to the commission. Accident reports shall not be open for public inspection except by order of the commission, and shall not be admitted in evidence in suits for damages, etc. (y) All companies subject to the act are to observe and obey all and singular the lawful orders and regulations which may be issued or made by the commission in the exercise of the powers conferred upon it by this act.

Article 3 defines the powers of public service companies. Section 1 authorizes the collection of reasonable rates for service, the establishment of sliding scales of rates and the establishment of rules for the payment of dividends. A public service company may participate in profits, for the purpose of encouraging efficiency (referring apparently to cases like Chicago, where the city and the street railways divide net receipts). Authority is given to make reasonable classifications of service, of patrons and of rates; to have reasonable rules for conduct of business; to require payment of charges in advance; to allow discounts for prompt payments; to take grievances before the commission.

Allowances made to shippers for service must be no more than just and reasonable.

Section 2 provides for granting by the commission of a certificate of public convenience, after which a public service company may be incorporated, or organized, and exercise its rights. Section 3 provides additional powers in this connection and authorizes municipal corporations to continue existing public service activities. Section 4 authorizes the issuance of stocks, bonds, etc., under suitable regulations and forbids fictitious increases of stock. Application may be made to the commission for a certificate of valuation, to show that a company has complied with this section. Notice must be sent to the commission of intention to issue stocks, bonds, notes, etc., giving full details. Notices of this kind sent to the commission shall be deemed to be public records and open to inspection, and may be given further publicity by the commission. Section 5 authorizes a company, on approval of the commission, to lay tracks across the tracks of other roads. Section 6 forbids the capitalization of franchises, rights, powers or privileges, in excess of the amount paid to the state or city therefor, and makes unlawful the capitalization of leases or contracts, or watering of stock when companies are merged. No company can acquire ownership or interest in any other company without the consent of the commission, except that an interest less than a controlling interest may be acquired without the approval of the commission, if otherwise lawful. Nothing in this act shall affect securities heretofore legally acquired and held, and a company already holding a majority interest in another may acquire additional interest.

Section 7 provides that after January 1, 1914, no public service company shall do business until it has filed and posted tariffs, as required by this law.

Section 8. Unjust discrimination in rates is unlawful, but where a mistake has been made a company is not bound to collect an undercharge, provided the commission, in advance, approves the waiver. Undue preference is forbidden. Section 9 contains a long and short haul provision, like that in the federal law, with a proviso that zone systems of rates are not prohibited. False billing, false description, etc., are forbidden. Excursion and commutation tickets are allowed. Any common carrier may grant free passes, or passes at a discount to any officer or employee of such carrier. Nothing in this act shall prevent telephone, telegraph, express or railroad corporations from contracting with each other for the exchange of service at free or reduced rates, such contracts to be filed with the commission. (There seems to be no provision for passes for members of employees' families or for any persons other than employees, unless it be in this clause relating to contracts for interchange of service.) Section 10 is a long and short haul law for telephone and telegraph companies. Section 11 provides that no contract with a municipal corporation shall be valid unless approved by the commission. Section 12 saves to public service companies their existing rights, except as expressly provided in this law.

Article 4 defines the constitution of the public service commission. Its title is "The Public Service Commission of the Commonwealth of Pennsylvania." (The names of the seven commissioners were given in our former article August 8, page 238.) Appointments by the governor are subject to the consent of the senate. A commissioner must be not less than 30 years of age. A quorum of the commission shall be four members. Four members may act, but their decisions must be unanimous. Section 4 requires all orders to be approved by at least four members. Section 5 defines the duties of the secretary and makes him chief executive officer of the commission. He is to be the disbursing officer and give a bond for $10,000. Section 6. The attorney general is general counsel and he shall appoint a counsel and an assistant counsel. One of these two must attend hearings before the commission and examine witnesses when requested so to do. Section 7. The marshal is to attend the hearings of the commission and preserve order and superintend the serving of subpoenas, etc. Section 8 provides for an investigator of accidents. He is to act under the direction of the commission, and also is to investigate any accidents, the happening of which may come to his knowledge; and he is to make a full and complete report to the commission; also report whether any public service company has failed to report an accident; he is to gather statistics and to make an annual report of his investigations, with recommendations as to means or methods whereby accidents may be averted. Section 9 provides for the employment of officers, experts, engineers, statisticians, etc.; and sections 10 and 11 prescribe the salaries.

Section 12 forbids commissioners to have other business; a commissioner must not have business relations with public service companies, or be a candidate for public office. Commissioners must not recommend anybody for employment to a public service corporation. Section 13 forbids public service companies and their officers and employees to offer anything to a commissioner. Section 14: If any employee violates the law the commission must at once dismiss him. Section 15: The governor, with the consent of the senate, may remove a commissioner or any of the counsel, for inefficiency, neglect, misconduct, etc., first giving the accused ten days' notice in writing and an opportunity to be publicly heard. The commission must hold meetings at least twice a month at Harrisburg, and may hold meetings at other places at any time. The office at Harrisburg must be open every business day from 9 a. m. till 5 p. m.

Article 5 defines the powers and duties of the commission. The 29 sections under this article cover, in different phraseology, many of the subjects already dealt with in previous articles. Orders requiring reasonable service or rates must be obeyed by every public service company. When the commission finds rates or service unreasonable or inadequate it shall issue an order making requirements for the future. This includes the power to fix joint rates. The commission may investigate proposed changes in tariffs and, after hearing and investigation, whether completed before or after the change goes into effect, may make such order in reference to the new rates as would be proper in a proceeding initiated after the same had become effective. In cases of this kind the burden of proof, to show that an increased rate is just, shall be upon the public service company. The commission may allow changes in rates within less than the prescribed 30-day limit. Where a decrease in rates is resisted the commission may require the company to give conditional rebate certificates. The commission may order reparation for overcharges, specifying the exact amount to be paid. A claimant who is not satisfied may sue the company in the court of common pleas. Orders requiring reparation must not be made on complaints filed more than two years after the time when the cause of action accrues; and a suit for the enforcement of an order must be filed within one year from the date of the order. No action shall be brought in a court on account of the wrongs and injuries here referred to until the commission shall have made a determination justifying it. (This seems to require that all suits against public service companies for inadequate service or for overcharges shall be brought through the commission.)

Section 6 requires street railway companies to transfer passengers, etc. Section 7 empowers the commission to order track connections and to make through routes and joint rates, but there is a provision relieving a road from joining in a through rate through a junction point which would unduly favor the connecting company. Sections 8 and 9 empower the commission to require telegraph companies to connect with other telegraph lines, and telephone companies to connect with other telephone lines, under reasonable regulations. The commission may divide joint revenue if the companies disagree.

Section 11: The commission may investigate interstate traffic and make complaints to the Interstate Commerce Commission. Section 12 gives the commission exclusive power over all matters connected with the abolition of grade crossings. In no case shall the consent of any court, board, or other commission or

officer, or of any municipality, be necessary. Where practicable, the commission may make general rules or orders to provide for crossing improvements, so as not to require the particular approval of the commission in each case. Where the commission determines the amount of compensation for damages the property owner, may, if necessary, sue the Commonwealth. In apportioning the expenses of changes at crossings, the commission may take into consideration the relative importance to the public of the services rendered by the public service companies concerned, and also priority of location; but where any portion of the cost is assessed on the state or city, such portion shall not be taken into account by the commission in fixing any valuation. Where an order requires relocation of or changes in adjacent structures, poles, pipes, etc., the public service company owning such structures, shall, at its own expense, make the changes. Before making a final order the commission must make an effort to reach an agreement with the cities or towns concerned. It may have crossing changes made by the public service company or by the city or town, or may do the work itself by contract.

Section 15 provides for prescribing a system of accounts. The commission may relieve any public service company from the duty of carrying a depreciation account. It may prescribe the account to which any item shall be charged or credited. Accounts and records must conform to the regulations of the Interstate Commerce Commission where practicable and desirable. The section empowering the commission to prescribe service, authorizes it to revise and change time tables and to alter the running time of trains; to regulate the distribution of cars and generally to make all arrangements and improvements in the service and facilities needed by the public. The power of the commission to determine the fair value of the property of every public service company may be exercised whenever a valuation shall be deemed necessary or proper under any of the provisions of this act.

In ascertaining and determining such fair value, the commission " may determine every fact, matter, or thing which, in its judgment, does or may have any bearing on such value; and may take into consideration, among other things, the original cost of construction, particularly with reference to the amount expended in the existing and useful permanent improvements; with such consideration for the amount in market value of its bonds and stocks, the probable earning capacity of the property under particular rates prescribed by statute or ordinance, or other municipal contract, or fixed or proposed by the commission, and for the items of expenditures for obsolete equipment and construction, as the circumstances and the historical development of the enterprise may warrant; the reproduction costs of the property, based upon the fair average price of materials, property, and labor, and the developmental and going concern value of such public service company; and these, and any other elements of value, shall be given such weight by the commission as may be just and right in each case."

Section 21: When a franchise is valued on the application of a public service company, or other valuations are made on application, the commission must hold public hearings and make a thorough investigation, and the finding of the commission must be in writing, to be known as a "certificate of valuation." No such certificate shall revive or validate any lapsed powers or rights. No certificate of valuation shall be taken as requiring the commission, in any subsequent valuation, to fix a valuation which shall be sufficient to yield a return to the holders of securities, nor shall the commission be bound to prescribe rates or charges which shall be sufficient to yield a return on securities.

The commission may withhold from the public information obtained in investigations.

Article 6 prescribes the procedure before the commission and on appeal, including duties and privileges of witnesses and rights of public service companies and others to make complaints. The Court of Common Pleas of Dauphin County (Harrisburg) is given jurisdiction over appeals, of certain classes, throughout the whole state. No injunction will be issued against the commission except on notice and after cause shown upon a hearing. All proceedings for such injunctions must be brought before the Court of Dauphin County, subject to appeal to the Supreme Court. To this Dauphin County Court the commission goes when it desires an injunction or mandamus against a public service company.

Sections 35-40 of this article provide penalties for violation of the law. Section 45: Nothing in this act shall impair the powers of the Secretary of Internal Affairs; and there is a like provision for other state departments. Section 47 prescribes prices for copies of official documents. The annual report of the commission is to be made on the second Monday of May, and sent to the governor; and a duplicate is to be filed with the secretary of internal affairs. Five thousand copies of the report shall be printed and bound in cloth. Section 51 repeals the railroad commission law and a number of others. The law of June 19, 1911, to promote the safety of travelers and employees on railroads, is continued in full force and effect.

Though the new law goes into effect only at the end of this year, the commission may require public service companies to file tariffs, rules and regulations after October 1. Section 11, article 3, requiring contracts to be approved by the commission, also goes into effect at once.

NOMOGRAPHIC METHOD FOR FINDING CENTER OF GRAVITY AND MOMENT OF INERTIA.

The usual method of finding the center of gravity and moment of inertia of rail sections is to divide the section into narrow strips of equal width and then, considering the area of these strips as forces, to construct a polygon of forces. This method is illustrated in Fig. 1 for a 100 lb. section. In this case the strips have been taken as ¼ in. wide and the middle ordinate of each strip was laid off in the construction of the force polygon to one-half scale. Since the summation of the middle ordinates of all the strips in the half section, multiplied by the width of a strip, ¼ in. is equal to the area of the half section, the area of the total section is equal to twice this product or ½ the summation. By plotting these middle ordinates to one-half the scale used in the cross section, the scaled distance representing the summation of these lengths when expressed in square inches is the area of the total rail section. The center of gravity is located in the common method by the intersection of the two extreme forces in the polygon and the moment of inertia by multiplying the area of the section by the area enclosed between the force polygon and the two extreme forces. The principal objection to this method is that the natural errors in drawing the force polygon are cumulative and therefore extreme care must be taken in making this drawing to get reasonably accurate results. The so-called moment area is obtained by the use of a planimeter.

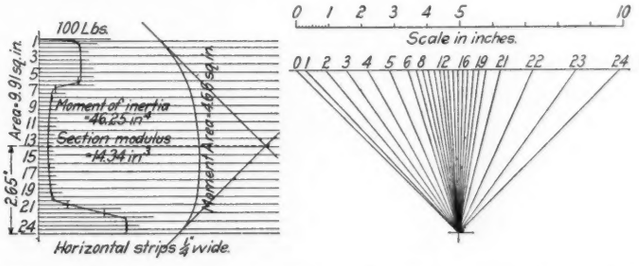

100 Lbs.
Area=9.91 sq. in.
2.65"
Moment of inertia =46.25 in.⁴
Section modulus =14.34 in.³
Moment Area=4.69 sq. in.
Horizontal strips ¼ wide.
0 1 2 3 4 5 10
Scale in inches.
0 1 2 3 4 5 6 8 12 16 19 21 22 23 24

Fig. 1—Common Method of Determining Center of Gravity and Moment of Inertia by Force Polygon.

The new method consists in drawing a "curve of moments"

and a "curve of inertia" for the section under consideration and measuring their respective areas by the planimeter. The ordinates used in plotting these curves are secured by reading a simple nomogram and the method constitutes an easy way of drawing the integral curve for these particular problems.

In order to explain properly the principles upon which this new method is based it is necessary to recall some of the principles of integral calculus, particularly the fundamental one that the area of a curve, $y = f(x)$ designated by A, is:

$$A = \int_{x_0}^{x} f(x)\, dx$$

This is the expression for the area between the curve and the X axis limited by the ordinates x and x_0. For the purpose of finding the moment of a given area about the axis X, we consider the weight of each vertical strip as equivalent to its area concentrated in the center of gravity of the strip, which in this case is easily seen to be half of the ordinate or height of this particular strip. If m is equal to the moment of the area of one elementary strip then:

$$m = \frac{y}{2} \times y\,\Delta x$$

and if further, M is equal to the moment of the entire area, then:

$$M = \Sigma m = \Sigma \tfrac{1}{2} y^2 \Delta x$$

This expression means that we must find the sum total of all the halved squares of the successive middle ordinates and multiply this sum by the width of the strips in order to find the total moment of area. If we consider the width of these strips as infinitely small then the summation becomes an integral and we can write:

$$M = \tfrac{1}{2} \int y^2\, dx$$

The moment curve for the 100 lb. rail section used in Fig. 1 is shown in Fig. 2. The axis OX may be taken in an arbitrary manner but in order to reduce the size of the resulting diagram it is better to place it as near as possible to the center of gravity judging by the eye. As the section is symmetrical, the center of gravity is obviously located on the vertical center line, but in the case of an unsymmetrical section the process would be repeated for a second axis taken at right angles to the first. In constructing the moment curve a few ruling points in the outline of

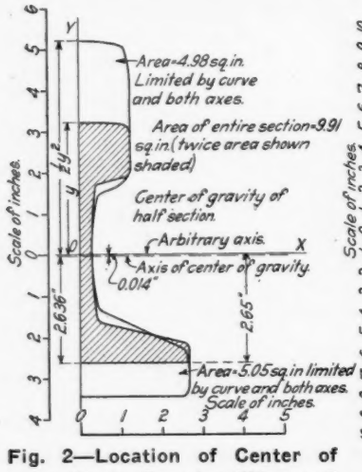


Fig. 2—Location of Center of Gravity by Drawing "Moment" Curve.

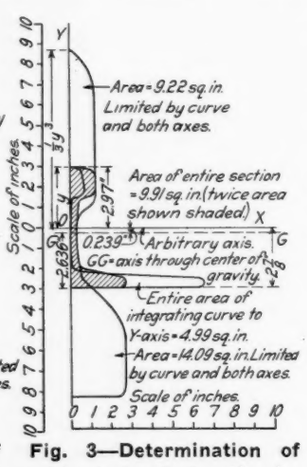


Fig. 3—Determination of Moment of Inertia by Construction of Inertia Curve.

the section are taken and the distances from those points to the OX axis are measured and considered as the ordinates of those points. By plotting on lines drawn through those points at right angles to the OX axis the values of $y^2/_2$, corresponding to the value of y at each point, the ruling points in the moment diagram are located. In order to get these values of $y^2/_2$, the ordinate can be measured with a rule graduated decimally in inches and using this value in the nomogram shown in Fig. 4, the corresponding value of $y^2/_2$ can be read directly. This nomogram is read simply by passing from one side of the graduated line to the other and the value of $y^2/_2$ so obtained is plotted to the same scale with which the ordinate was measured. The scales of inches are added in this figure to enable the reader to follow

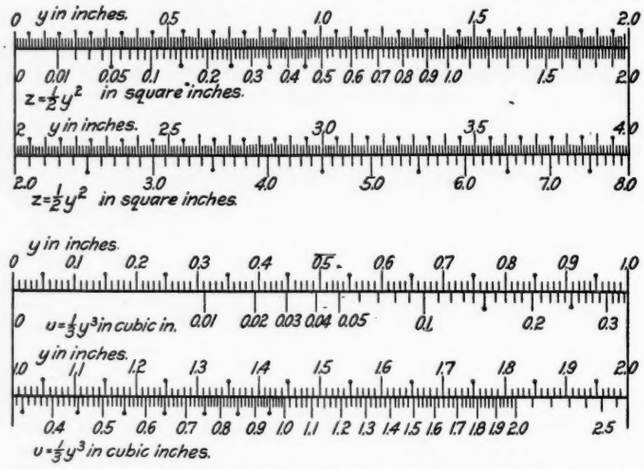


Fig. 4—Nomogram for Use in Constructing Moment and Inertia Curves.

the construction independently of the reduction in the engraving. Since it was shown above that the total moment of the section equals:

$$(\tfrac{1}{2}) \int y^2\, dx$$

it is evident that the area of the moment curve represents the moment of the section. The X axis will pass through the center of gravity only when the moments on the two sides of the axis are equal or, in other words, when the area of the curve above and below the axis is the same. Measuring the areas in Fig. 2 it is found that the moment curve above the OX axis has an area of 4.98 sq. in. and that below this axis 5.05. This indicates that the center of gravity is below the axis OX and the distance between OX and the true neutral axis is found by dividing the difference between the areas of the moment curves by the area of the half section of the rail which gives:

$$\frac{5.05 - 4.98}{4.955} = 0.014 \text{ in.}$$

As the distance from the base line of the section to the OX axis was taken as 2.65 in., which was the distance obtained in Fig. 1, the shift of 0.014 in. indicates the greater accuracy of the new method. The corrected distance from the base line to the center of gravity is therefore 2.636 in.

By a similar line of reasoning the corresponding method for obtaining the moment of inertia is derived. In the case of a body in general the moment of inertia is defined as the summation of the products of the weight of each particle by the square of its distance from a given axis. If in a curve represented by the equation $y = f(x)$, y represents the height of a strip of the width Δx and we take out of this strip an element of height Δy_1, calling the distance from the center of gravity of the element to the X axis y_1, then the finite element of the moment of inertia for this element of area is:

$$\Delta I = (\Delta y_1\, \Delta x)\, y_1^2$$

and the summation of all such elements will be:

$$I = \Sigma y_1^2\, \Delta y_1\, \Delta x$$

The first part of this summation is equal to the definite integral:

$$\int_0^y y_1^2\, dy_1 = \frac{y^3}{3}$$

and accordingly we get for the total summation the definite integral:

$$I = (\tfrac{1}{3}) \int_{x_0}^{x} y^3\, dx$$

The diagram Fig. 3 shows how this integration is effected by the help of a planimeter by constructing the curve of inertia for the same rail section as in the previous examples. The axis *OX* is taken arbitrarily and the values of $\frac{1}{3}\ y^3$ used in plotting the inertia curve are obtained from the second nomogram in Fig. 4. The use of this nomogram for finding this curve is the same as that described in connection with Fig. 2. The total moment of inertia about the *OX* axis is represented by the area of its inertia curve, which is shown by the planimeter to be 9.22 sq. in. above the axis and 14.09 sq. in. below it. The moment of inertia of the total section is equal to twice the sum of these areas or:

$$2\ (9.22 + 14.09) = 46.60\ \text{in.}^4$$

The minimum total moment of inertia which is that in respect to the axis *GG* through the center of gravity is found by the well known rule covering moments of inertia about parallel axes, namely:

$$I_g = 46.60 - 9.91 \times (0.239)^2 = 46.03\ \text{in.}^4$$

The so-called section modulus is found by dividing this minimum moment of inertia by the maximum distance from the axis through the center of gravity to the edge of the section. In this case this is equal to: $46.03/3.209 = 14.34\ \text{in.}^3$.

ACCIDENT BULLETIN NO. 46.

The Interstate Commerce Commission has issued quarterly accident bulletin No. 46, containing the record of railway accidents in the United States during the three months ended December 31, 1912. The number of persons killed in train accidents was 250, and of injured, 4,334. The total number of casualties of all classes, including industrial accidents, was 2,967 killed and 51,323 injured. "Industrial Accidents" are those occurring to employees where the movement of cars or engines is not involved. The accidents are summarized as follows:

TABLE NO. 1.—CASUALTIES TO PERSONS—STEAM RAILWAYS.

Causes.	Passengers.		Employees (including employees not on duty).		Other persons (trespassers and non-trespassers).		Total persons.	
	Kil'd.	Inj'd.	Kil'd.	Inj'd.	Kil'd.	Inj'd.	Kil'd.	Inj'd.
Train accidents.								
Collisions	42	1,313	107	1,078	11	24	160	2,415
Derailments	15	1,079	45	483	7	33	67	1,595
Miscellaneous train accidents (416)	..	13	22	310	1	1	23	324
Total	57	2,405	174	1,871	19	58	250	4,334
Other than train accidents.								
Accidents to roadway or bridges not causing derailment (104)	..	...	...	...	...	...	...	...
Other accidents (classes C-3 to C-12, inclusive)	57	1,923	790	13,730	1,764	3,076	2,611	18,729
Total	114	4,328	964	15,601	1,783	3,134	2,861	23,063
Industrial accidents to employees.								
While working on tracks or bridges	..	...	27	5,988	...	...	27	5,988
At stations, freight houses, engine houses, etc.	..	...	36	6,649	...	...	36	6,649
In and around shops.	..	...	29	13,422	...	...	29	13,422
On boats and wharves	..	...	8	508	...	...	8	508
At other places	..	...	6	1,693	...	...	6	1,693
Total	..	...	106	28,260	...	...	106	28,260
Grand total	114	4,328	1,070	43,861	1,783	3,134	2,967	51,323

TABLE NO. 1A.—COMPARISON WITH FORMER QUARTERLY RECORDS.

No.	Item.	Bulletin 46.	Bulletin 45.	Bulletin 42.
1	Passengers killed in train accidents	57	88	27
2	Passengers killed, all causes	114	156	78
3	Employees (on duty) killed in train accidents.	170	153	183
4	Employees (on duty) killed in coupling	54	32	53
5	Employees (on duty) killed, total	861	712	850
6	Total passengers and employees (items 2 and 5, above)	975	868	928
7	Other persons killed (including trespassers, non-trespassers, and employees not on duty), all causes	1,886	2,127	1,798
8	Employees killed in industrial accidents	106	114	78
	Grand total (items 6, 7, and 8)	2,967	3,109	2,804

The total number of collisions and derailments in the quarter under review was 3,994 (1,859 collisions and 2,135 derailments), of which 229 collisions and 194 derailments affected passenger trains. These are classified as follows:

TABLE NO. 2.—COLLISIONS AND DERAILMENTS.

No.	Classes.	Number.	Damage to road and equipment.	Number of persons— Kil'd.	Inj'd.
	Collisions—				
1	Rear	359	$440,352	65	850
2	Butting	184	372,432	63	722
3	Trains separating	128	53,633	2	91
4	Miscellaneous	1,188	553,931	30	752
	Total	1,859	$1,420,348	160	2,415
	Derailments due to—				
5	Defects of roadway	488	$454,412	18	634
6	Defects of equipment	1,041	864,264	9	226
7	Negligence	156	85,047	8	174
8	Unforeseen obstruction	63	111,435	9	175
9	Malicious obstruction	16	26,152	3	43
10	Miscellaneous causes	371	447,295	20	343
	Total	2,135	$1,988,605	67	1,595
	Total collisions and derailments	3,994	$3,408,953	227	4,010
	Total for same quarter of—				
	1911	3,346	$2,893,948	230	4,132
	1910	3,366	2,831,469	219	3,175
	1909	3,206	2,733,830	220	3,731
	1908	2,684	1,940,133	173	2,616

The usual tables are given classifying certain accidents in detail. Table 1B is an amplification of Table 1. Table 3 divides into twenty-eight sub-classes the causes of accidents to employees in coupling and uncoupling cars. Table 3A classifies these same accidents according to the nature of the injuries. Table 4 divides into eighteen sub-classes the causes of accidents to employees due to falling from cars and getting on or off cars.

Table 2A divides into eight sub-classes derailments due to defects of roadway; Table 2B divides into thirteen sub-classes those due to defects of equipment. Table 1D gives a surgeon's classification of the 23,063 injuries to passengers, employees and others, which are summarized in table No. 1. There are 32 classes. For example, of the 23,063 injuries, 3,651 are classed as contusions of the body; 3,945 are sprains; 1,036 are entered in the table as "slight" injuries, and 1,647 are entered as not clearly described.

Tables 4A, 5A and 8A sub-divide the causes of miscellaneous accidents on or around the trains; of cases where trainmen strike overhead bridges, etc., and of miscellaneous accidents on or around the trains to passengers and to employees not engaged in work connected with the operation of the train.

Twenty-five accidents occurring during this quarter were investigated by the inspectors of the commission, and the reports of these investigations fill 41 pages of the bulletin. The accidents occurred as follows:

Baltimore & O. S. W.	W. Athens, Ohio	Oct. 2.	Butting collision
New York, N. H. & H.	Westport, Conn.	Oct. 3.	Derailment
Western Maryland	Kobeen, Pa.	Oct. 7.	Butting collision
Baltimore & Ohio	Chicago Junction, Ohio.	Oct. 10.	Rear collision
Louisville & Nashville	Cunningham, Ala.	Oct. 12.	Derailment
Delaware, L. & W.	Hallstead, Pa.	Oct. 18.	Rear collision
Illinois Central	Hopkinsville, Ky.	Oct. 20.	Derailment
Norfolk & Western	Cooper, W. Va.	Oct. 20.	Derailment
Lehigh Valley	Hornets Ferry, Pa.	Oct. 27.	Rear collision
Western & Atlantic	Emerson, Ga.	Nov. 8.	Butting collision
Yazoo & Miss. Valley	Montz, La.	Nov. 12.	Rear collision
Cincinnati, H. & D.	Indianapolis	Nov. 13.	Butting collision
New York, N. H. & H.	Green's Farms	Nov. 16.	Derailment
New York, N. H. & H.	Putnam, Conn.	Nov. 16.	Rear collision
Seaboard Air Line	Granite, N. C.	Nov. 16.	Butting collision
Texas & Pacific	Alexandria, La.	Nov. 23.	Rear collision
Western Maryland	Blue Mountains, Md.	Nov. 27.	Butting collision
Pennsylvania	Glen Loch, Pa.	Nov. 27.	Derailment
Pennsylvania	Dresden, Ohio	Dec. 3.	Rear collision
Western Maryland	Pen Mar, Pa.	Dec. 6.	Butting collision
Northern Pacific	Toppenish, Wash.	Dec. 10.	Butting collision
Atchison, T. & S. F.	Williams, Ariz.	Dec. 10.	Rear collision
Great Northern	St. Paul, Minn.	Dec. 10.	Rear collision
Baltimore & Ohio	Glencoe, Pa.	Dec. 12.	Derailment
Pennsylvania	Bowerston, Ohio	Dec. 13.	Rear collision

Electric railways reporting to the commission (not included in the foregoing statistics) had 111 persons killed during the quarter and 1,387 injured; and there were 61 collisions and 18 derailments. Train accidents are charged with 7 fatalities. The total number of passengers killed from all causes was 8, and of employees 16 (3 in industrial accidents). The number of trespassers struck or run over by cars was 55; 29 killed and 26 injured.

A NATIONAL PROBLEM.*

Foodstuffs of nearly every sort have increased in cost during the past dozen years, while in the United States, with the notable exception of beef cattle, the production of foodstuffs has not lessened, but, on the contrary, has greatly increased.

As to the reasons for the increases in cost of living, the economic doctors disagree. It is enough here and now to state that the problem exists and that a great transportation agency —ideally equipped for the handling of perishable food products —is going to use its best wits and its best energies to help in the solution of that problem. The transportation agency is the express, and the particular express that is going to make the effort is the express of Wells Fargo & Company.

The company realizes that it is now necessary to bring into being an organization, studying all the phases of the problem and moving in harmony with them. To that end it has enlarged its former order and commission department into the order, commission and food products department, which came into existence August 1. It will join hands with all forces interested in the research of the cost-of-living question. The question is largely one of the distribution of food products in which the farmer and other producers, the distributor, the consumer and the carrier are mutually interested.

Wells Fargo & Company has maintained an order and commission department for many years, through which it has performed various public services, such as attending to commission for purchase and sale of goods, the recording of deeds, the payment of taxes, the reclaiming of baggage or other goods of value. The largest function of this department has been the promotion of the growth and production, especially in the west and southwest, of fruit and vegetable traffic, by first maintaining a corps of trained industrial agents at all seasons of the year to aid the producer in finding suitable location and soil, and, second, by assisting in securing markets for his production, and then in providing convenient, speedy and safe transportation. Practically all of the immense shipments of vegetables, berries, melons and other fruit which now move in carloads and train loads had their beginnings in small shipments by express. The express rates and service furnished transportation facilities necessary for the development of a great industry, and which were not otherwise available.

From these beginnings came the refrigerator car. It is worthy of recording here and now that the first refrigerator car ever built for passenger train service was built by Wells Fargo & Company, and that it went into service hardly more than a decade ago.

The order, commission and food products department comes as an outgrowth of the former order and commission department. The organization, which will be connected with the traffic department of the company, will consist of a manager and a group of industrial agents, who will direct the work, which will be performed, in its details, by the agencies and employees of the company.

The aim of the department will be to study the food products problem from various viewpoints, and to encourage and assist growers and producers by aiding them in the finding of suitable markets among dealers and consumers, and in the securing, at minimum cost, of suitable sanitary packages or containers in which to ship. It is a well-established fact that one of the greatest obstacles to an increased shipment by farmers and small producers in general, of fruits, vegetables, poultry and the like, has been the lack of availability of satisfactory containers in which safely to make shipments in small quantities.

Careful inquiry does not indicate a general shortage in the supply of food products; the difficulty seems to be that the system of distribution has not kept pace with the growth of the country, and that it is in many details complicated and expensive, particularly in the larger cities. In towns a greater quantity and variety of seasonable fruit, vegetables and the like would be consumed if there was an organization having definite information regarding the produce that could be sold and where it could be obtained in producing and distributing sections. It is intended that this department shall gather information that will enable the producer, the distributor, the consumer and the carrier to keep more closely in touch with each other, to the very material benefit of all.

Agents of Wells Fargo & Company will be called upon by the food products department for names of growers and shippers of food products from their stations. The department will be anxious to know about the containers or shipping packages now in use—and those required by prospective shippers. The names of dealers, both wholesale and retail, of hotels, restaurants and co-operative clubs will be sought by the department. Its facilities will be extended to all interested in food production or consumption—the grower, producer and distributor, as well as the consumer. In this department the consumer who prefers to purchase foodstuffs direct from the producer will find a valuable aid.

An important function of the new department will be the publication of bulletins in booklet form and at frequent intervals. These will be intended for large distribution and will deal not only with what the department is doing in general, but also with specific and unusual offers, such as the shipment of individual packages of fruits, vegetables, nuts and the like.

At present there is a tendency toward indiscriminate shipments to points where markets either do not exist or have already been supplied. This results in unsatisfactory returns to growers, and to improve on this condition, constant communication will be maintained between the food products department and our agents in those districts where produce is raised in considerable quantities. By this means, advice can always be had well in advance of the movement of the crop as to its probable volume, and the date when it is likely to move. This will enable the company to assist in finding a market and should result in the products being distributed to better advantage.

*From an article in the *Wells Fargo Messenger* for August, 1913.

THE G. R. S. TRAIN DESPATCHER'S SELECTOR.

The General Railway Signal Company, Rochester, N. Y., has issued bulletin No. 114B, describing its train despatcher's telephone selector system, which is now in use under exacting conditions on a number of important circuits. With the completion of contracts on which work is now under way, this apparatus will be in service on nine circuits, aggregating 922 miles. On these circuits there are 283 selectors and 291 bells. Five of these circuits are on the New York Central & Hudson River, three on the Illinois Central and one on the Toronto, Hamilton & Buffalo. Current is furnished by motor generators in all of these installations except on the T. H. & B., where dry battery is used.

One of the first installations of these instruments was on the Rochester division of the New York Central, between Rochester and Niagara Falls, 76 miles. During the year ending April, 1913, there was on this line an average of 544 calls per day, and a maximum of 959. The current consumed was 475 kilowatt hours. In this circuit the motor generator is operated from a storage battery, which is on float charge from 110 volts d. c. commercial circuit. This circuit is to be extended to include another division; and then the motor generator will be operated direct from a commercial circuit, with the storage battery in series with the motor circuit, which will materially reduce the current consumption. Standard time is transmitted by the selector equipment on this circuit.

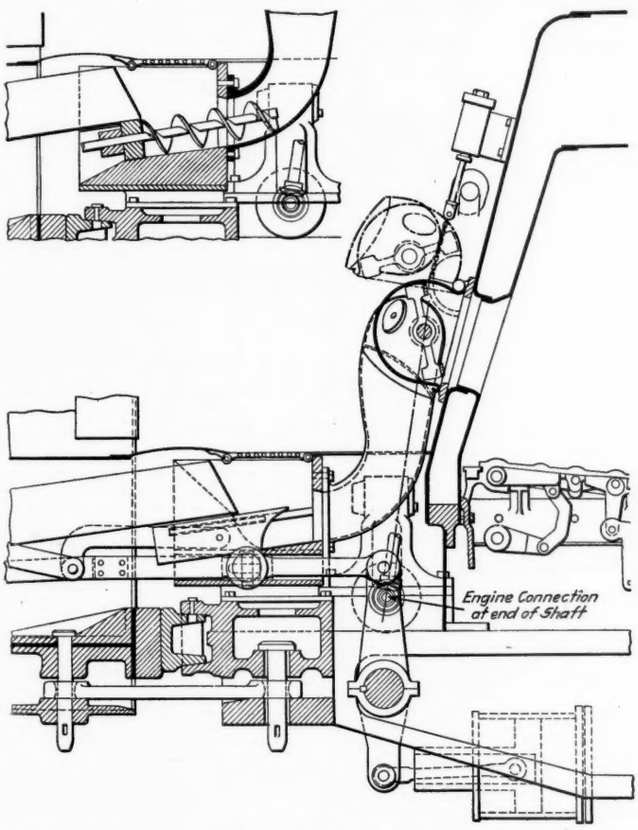
One circuit on the Adirondack division of the New York Central using this apparatus comprises 250 miles of line, 49 selectors and 56 bells. The line voltage required is 400, which

is normally supplied by an A. C.-D. C. motor generator, operated from a three-phase, 110-volt, 60-cycle commercial circuit. The storage battery will be charged by an A. C.-D. C. charging set. An extra D. C.-D. C. line motor generator is to be provided as a reserve, so that in the event of a failure of the commercial circuit the line can be operated from the storage battery.

This selector apparatus is described in the Signal Dictionary, page 128, and is specially designed for economical consumption of power. The selector requires a small number of impulses to each call. The apparatus has no time element device and no preliminary or clearing impulses are used in its operation.

HERVEY LOCOMOTIVE STOKER.

The Hervey stoker, which is of the top feed or scatter type, was used on a Mikado type locomotive on the Baltimore & Ohio between Philadelphia and Baltimore, making a total of 6,500 miles. The most noticeable feature about it is the distributor, which is constructed like a fan. In order to properly distribute the coal to all parts of the firebox the blades of the distributor are so deflected as to deliver the fuel first to one side and then to the other. This distributor is so arranged in its casings that



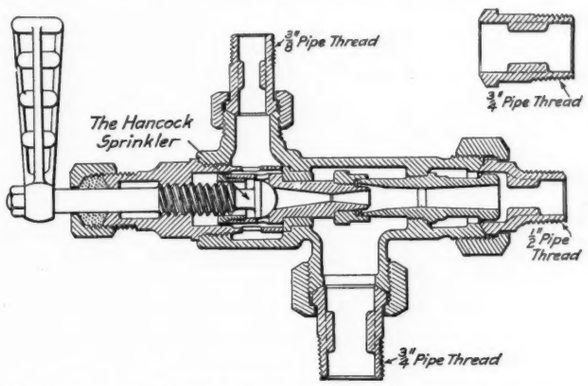
Hervey Locomotive Stoker with the Crawford Conveyor.

it may be swung out of the way in case it is necessary to resort to hand firing.

The coal may be delivered to the distributor either from above or below. The illustration shows an application of the Hervey stoker to a Pennsylvania Lines locomotive in connection with the Crawford tender feed arrangement. A special type of screw conveyor is employed in this case and is shown in the small view. A 7 h. p. steam engine is used to drive both the conveyor and the distributor, this being accomplished through the use of bevel gears. In this application the screw conveyor passes the coal up through the feed passage to the distributor. This stoker was invented and patented by D. F. Hervey, Logansport, Indiana.

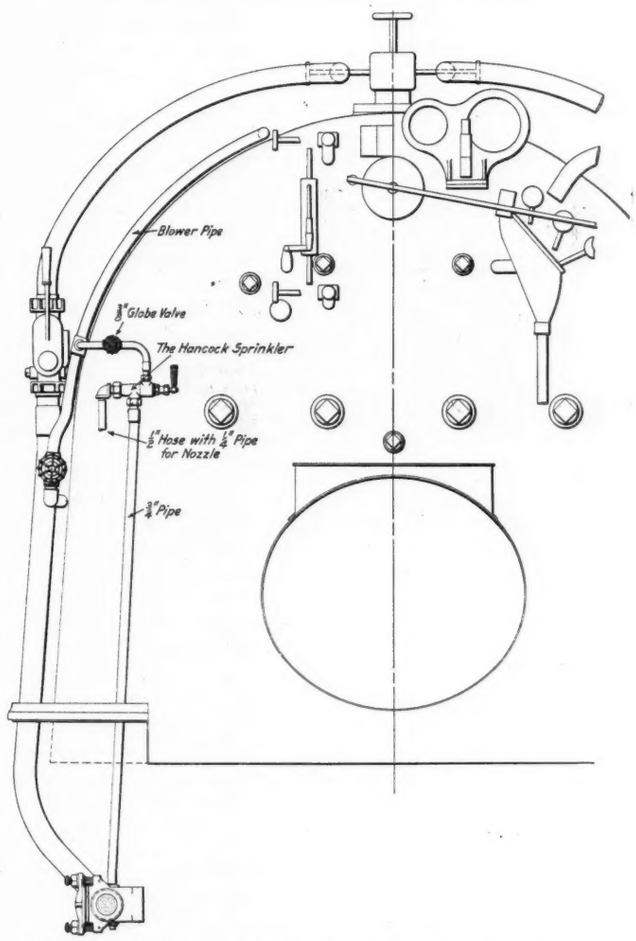
IMPROVED COAL SPRINKLER.

Among the devices recently placed on the market for the use of locomotive firemen in sprinkling coal is the ejector which was developed by the Hancock Inspirator Company, Boston, Mass., and was described in the *Railway Age Gazette,* June 27,



Section Through the Hancock Improved Coal Sprinkler.

1913, page 1613. Investigation of the subject of coal sprinklers has convinced the manufacturers that, as a safeguard, the apparatus should be operated entirely by one handle, so arranged that the water connection will positively be closed when



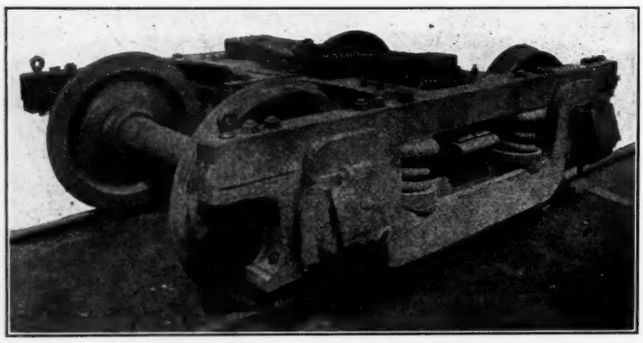
Location of the Hancock Coal Sprinkler in a Locomotive Cab.

the sprinkler is not in operation. Unless the water passage is entirely closed when the injector is used for heating the water in the tank, steam is likely to back up through the suction pipe of the sprinkler and result in injury. With sprinkling devices having

separate valves for the steam and water connections, there is always the possibility that the man operating the device will forget to open the water valve in the suction when starting the sprinkler, or forget to close it when shutting off the sprinkler. In an improved coal sprinkler which has been devised by the Hancock Inspirator Company, only one handle is used, and this operates both the steam and water valves. As shown in the drawing of the cross section, the sliding steam nozzle is so constructed that its front end overlaps the back end of the combining tube when the steam valve is closed, thus effectually closing the water opening; when the steam valve is open the steam nozzle which is attached to it is drawn back from the combining tube at the same time that the steam port is opened. The sprinkler, as shown in the other illustration, is located on the left hand side of the cab and takes its water supply from the suction pipe of the injector through a ¾ in. pipe. A ⅜ in. globe valve is placed in the steam supply pipe to shut off the steam from the sprinkler when necessary.

EQUALIZED SWING-MOTION TENDER TRUCK.

A locomotive tender truck that has proved satisfactory with high speed locomotives, has recently been perfected by the Commonwealth Steel Company, St. Louis, Mo. It has a swing-motion bolster carried on three-point hangers which are so designed as to support the tender in a stable manner without responding laterally to slight track imperfections, such as low joints, etc. The truck frame, in many respects, follows the design which has been previously used by this company for four wheel passenger car trucks and combines the cross transoms



Equalized Tender Truck with Swing-Motion Bolster.

and the wheel pieces in one steel casting. It is claimed that with the three-point hanger for the bolster, the impact between the wheel flange and the rail when entering a curve at high speed is greatly reduced, because the cistern is lifted by the side swing of the bolster and thus tends to throw the whole truck away from the rail. The truck is equalized in practically the same manner as a passenger car truck, the wheel pieces being supported on the equalizers by large single coil springs placed as close as possible to the boxes. It will be noted that the springs supporting the bolsters are set well in toward the center, thus tending to keep all weight well inside the gage limit and defeating any tendency to lift the wheels from the rail.

C. P. Observation Cars for Switzerland.—Following an agreement between the Swiss Federal Railways and the Canadian Pacific, the latter has extended the existing observation car service in Austria, which was inaugurated last year, to Switzerland, and the new service of cars started on August 26. Hitherto these Canadian Pacific observation cars have been confined to the three Austrian services, viz.: from Trieste to Salsburg; Vienna to Innsbruck; and from Innsbruck to Buchs. The latter service now crosses the border between Austria and Switzerland at Buchs.

General News.

The annual picnic of the Railroad Club of Kansas City will be held at Fairmount Park on Saturday, August 30.

Representative Nolan, of California, has introduced in Congress a bill to prohibit interstate transportation of goods produced by convict labor.

The New York, New Haven & Hartford, during the last fiscal year, has distributed among the farmers along its lines the sum of $1,200,000 in payment for sleepers and fence posts, mostly in western Connecticut and Massachusetts.

Officers of the Burlington road have this week agreed with the representatives of the company's conductors and brakemen, following long discussions with the government mediator, that the questions concerning wages which are now pending shall be submitted to arbitration.

The Canadian Pacific is planning to more than double its use of oil as fuel for locomotives. This fuel is now used on the engines between Field, B. C., and Kamloops, 260 miles. and the engines are now being fitted for it on the line extending west from Kamloops to the Pacific coast, about 250 miles.

The Central of Georgia employs women as stenographers, typists and clerks in the car record office, and also in considerable numbers in the accounting department. The press despatch, recently printed, to the effect that a larger proportion of women will be employed in the future, applies only to the accounting department.

"First Aid to the Injured" is the subject of the opening article in the Buffalo, Rochester & Pittsburgh Employees' Magazine for August; and three employees are specially mentioned because of prompt and intelligent services in behalf of injured persons; Conductor F. W. Knapp, Conductor M. E. Moynihan and Miss Veronica M. Larkin, a telegrapher.

The Agricultural Department announces that about 125,000,000 ft. of timber will be sold from the Bonneville National Forest, Wyoming. A period of eight years will be allowed for cutting the timber and the minimum prices are $2.75 per M. ft. for logs; $1.50 per M. for posts and 8½ cents each for hewed sleepers. The timber is principally lodge pole pine, spruce and fir.

The Pennsylvania Railroad, which keeps small quantities of dynamite at certain points along the line of the road for use in case rocks should fall on the track, has adopted, for the safe keeping of the dynamite, a standard plan for a small ventilated, bullet proof and fireproof building. This building in its construction will conform to the requirements of the Bureau of Explosives.

Figures brought out at the hearing before the California Railroad Commission on July 30, showed that during the month of June the Southern Pacific carried on its suburban and ferry service between San Francisco and Alameda county, 1,733,191 passengers. The company has given out a statement to the effect that it is losing $750,000 yearly on this suburban ferry and train service in Alameda County, where costly electric propulsion has recently been introduced.

The twenty-fourth annual report of the relief department of the Chicago, Burlington & Quincy for the calendar year 1912 shows total disbursements of $596,792, of which $563,158 was contributed by members, $20,625 represented income from investments and $13,009 was advanced by the railroad. The company has now advanced a total of $51,272. Since the department was organized in 1889 it has paid out a total of $8,834,394, on account of sickness and accidents. The membership in 1912 was 26,328.

The western section of the engineering committee appointed by the railways to confer with the engineering board of the Interstate Commerce Commission on matters connected with the valuation of the railways, held meetings last week in Chicago on August 19, in St. Louis on August 20, and in Denver on August 22, for the purpose of discussing the tentative specifications for maps and profiles issued by the commission. At each place the committee conferred with engineers of the roads in the immediate territory.

Sir Richard McBride, prime minister of British Columbia, in a recent newspaper interview at New York, advocated the construction of a railroad from the state of Washington to Alaska, across British territory, declaring such a line necessary in the interests of this country and expressing the belief that Canada would be only too willing to favor such a project. The minister's idea was that, with access by sea alone, this country could not properly defend Alaska in case of war. On Tuesday of this week Representative Johnson, of the state of Washington, introduced in Congress a joint resolution, requesting President Wilson to negotiate with the British and Canadian governments for the establishment of a railroad, as proposed by Sir Richard.

The British postmaster general, in a letter to the Cunard Steamship Company, in relation to running special mail trains between London and Holyhead, says that the London & Northwestern has demanded increased compensation and that, in the opinion of the postmaster general, the increase is reasonable. For service which has been performed for the sum of £5,510, the company demands £7.038 per annum; and this increase is based on (1) an increase of operating expenses, which makes it necessary to charge for special trains 5 shillings a mile instead of 4s. 6d.; and (2) the cost of running a vessel from Holyhead to Ireland has increased so that the charge for this service must be made £100 instead of £80. It appears that for these special trains the Cunard company pays one-third of the cost.

After mediation by G. W. W. Hangar of the United States board of mediation and conciliation the Southern Pacific and its trainmen have agreed to submit to arbitration their controversy regarding the status of employees on the company's electric lines. The board of arbitration will consist of Max Thelen, member of the California Railroad Commission; W. R. Scott, general manager of the Southern Pacific, and M. E. Montgomery, assistant chief of the Brotherhood of Locomotive Engineers. Hearings will begin on September 1. The railroad company contends that certain of its electric cars in Alameda county, which are operated under a street car franchise and stop at every crossing, should be run on a different basis from through suburban service, stopping only at regular stations.

The "Safety First" bulletin of the Delaware, Lackawanna & Western gives, in its last issue, a condensed statement of the deaths and injuries of employees on that road during the last three fiscal years and shows decided decreases, the figures for the three years, 1911, 1912 and 1913 being as follows: Killed 34, 21, 19; injured 137, 121, 109. This result is attributed in large measure to the work of the safety committees. This bulletin contains the portraits of the seven members of the general safety committee. It contains also some verses on safety written by a school girl, 13 years old. The general committee, through its secretary, William C. Wilson, 90 West street, New York City, offers a prize of $25 for a poem on the subject of safety from accidents, open to sons and daughters of employees of the road. There is a second prize of $15 and another of $10.

Electrification in British Columbia.

The Canadian Pacific is planning to electrify its line between Rossland, B. C., and Castlegar, 29 miles. The power will be direct current, 2,400 volts, the system being similar to that in use on the Butte, Anaconda & Pacific.

Making Change in Selling Tickets.

If in making change the amount of the fare is distinctly named and the change then counted out to the passenger from such amount up to the amount of money received, there will be no room left for error or misunderstanding, and troublesome complaints on the part of passengers will be prevented. This method is the rule in stores generally, and it would seem to be a good one for the railroad ticket agent to follow.—*Chicago & North Western Monthly Traffic Bulletin.*

Getting Down to Fundamentals.

The Railroad Commission of Louisiana proposes, after giving a public hearing, to take up for adoption the following rule: "All railroads operating in the state of Louisiana shall give all passenger trains preference over freight trains and shall handle said passenger trains and coaches promptly on their lines, and at all junctions, stations, terminal points and river transfers.

Safety First on the Grand Trunk.

The Grand Trunk Railway of Canada has begun a campaign for "Safety First" and has engaged George Bradshaw, formerly of the New York Central, as safety engineer. "Mr. Bradshaw," says the vice-president's circular, "will deliver at all important centers lectures on safety and will illustrate practices responsible for injuries. Notice of the time and place of these lectures will be given, and it is desired that every employee on the system, whose duties permit shall attend. No employee who considers the importance of his personal safety can afford to miss the opportunity which these lectures will afford to learn something of practical value for the protection of his life and limbs.

"We hope to reduce the personal injury record to the lowest possible point and to make our system the safest in the country. To accomplish this every officer, agent and employee is requested to give his earnest and active support and co-operation."

Grade Crossing Costs on the New Haven.

The New York, New Haven & Hartford has issued a statement giving a long list of places in Massachusetts, Rhode Island and Connecticut, at which extensive improvements have been made by the company during the past five years, and in Massachusetts alone it appears that the sum of $4,500,000 has been spent on grade crossing improvements. Thirty-five grade crossings have been abolished within that time. Taunton, Braintree, Worcester and Clinton are among the principal places at which work has been done. Of the cost of the extensive improvements at Worcester, including a union station, the New Haven road pays $843,515. The line from Boston to Providence is to be electrified and in connection with this work all of the grade crossings will be done away with at a cost of $1,400,000. The company last year finished the double tracking of its line in western Connecticut, between Hawleyville and Shelton, and in connection with that work abolished 22 grade crossings within 20 miles. New England is a thickly settled territory, and it is doubtful if any other road in the country has abolished grade crossings at so fast a rate.

Norfolk & Western Electrification.

The Norfolk and Western has closed a contract with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., to supply all the electrical apparatus required to electrify the road between Bluefield and Vivian, W. Va. The contract calls for 26 130-ton electric locomotives of the single phase-two phase type, together with all necessary power house generating machinery and transmission apparatus.

Single phase alternating current of a frequency of 25 cycles and at 11,000 volts will be supplied to the locomotives through an overhead suspended trolley wire, this system being the same as that in use on the New York, New Haven & Hartford, the Boston & Maine in the Hoosac Tunnel, the Grand Trunk in the Sarnia Tunnel and by the New York, Westchester & Boston. The Bluefield-Vivian Section serves the Pocahontas coal region, and the coal handled amounts to 65,000 tons a day, necessitating trains of 3,250 tons. The maximum grade is two per cent., and at the present three Mallet locomotives are used on each train. Power for the entire electrified section will be generated in a central power house located at Bluestone, W. Va., with an installed capacity of 27,000 k. w. in turbo generators. The traffic conditions of this section of the road are especially well adapted to electrical operation. It is in reality a separate locomotive division at present, and it is claimed it can be operated electrically without affecting the cost of locomotive service on other sections of the road.

Howard Elliott to New Haven Stockholders.

"On and after September 1 I shall come to New Haven and take off my coat and go to work. I shall endeavor to perfect an organization, if one does not already exist, that will attend closely to all of the details that are so important to you as owners and to the public that the railroad serves. Little matters

such as those mentioned by our good friend, Mr. Davis, should be attended to, and yet you probably do not realize the enormous amount of detail connected with a road the size of the New York, New Haven & Hartford. The engines of the New Haven every day run 120,000 miles, or five times around the earth. It means a great deal of attention to have every little detail attended to, but we will try to do it and we will try to see that the scrap is picked up and either sold, or, as is sometimes the case, it is cheaper to bury it rather than to pay the labor cost of moving it.

"I listened with great interest to what Mr. Hiller said about the stockholders. I am told there are nearly 25,000 stockholders of this company and they have a duty and they can exert an influence themselves to help the management of this company, because directors and officers of late years have been sorely beset in trying to do their duty to the owners and to the public. We have had to meet rate reductions; we have had to meet increased cost of labor, increased cost of material, and demands from a luxurious people for better facilities.

"The stockholders can do a great deal of good, each one of them in their own circle, in trying to present to their legislators, to their members of congress, to members of commissions and to all who go to work to make the different laws under which the railroad is trying to operate, the stockholders can do good by pointing out that there are two sides to this question and that the side of the stockholders must not be lost sight of in considering the question and in making demands upon the railroad."

Safety First on the Erie.

The "Safety-first" idea has become so popular that it appears in a thousand guises, and circulars are literally "too numerous to mention," except as they afford additional useful lessons, or embrace some novelty. From a couple of pages of useful maxims in the *Erie Employees' Magazine*, prepared by E. I. Bowen, superintendent of the Rochester division, we copy such as seem to be out of the usual run:

"Carelessness never won a promotion. A man who has lost interest in his record is worse than useless—he is dangerous.

"When your rule tells you to flag, flag! Remember that many lives are entrusted to your care; you are paid to go back, and there is no possible excuse for not going back. Be sure and go back far enough. It is raining just as hard or it is just as cold twenty feet from the rear of your train as it is back 18 to 35 telegraph poles. When flagging, don't stand near a gang of men at work on track.

"An elderly or feeble person deserves and should have your most careful attention, particularly in getting on or off trains.

"When using step-box, say to each passenger, 'Watch your step' and say it pleasantly.

"Study your time table if you wish to, but don't overlook the fact that your book of rules contains some mighty valuable reading matter.

"Never allow a squirt hose to hang outside of cab, where it might be mistaken for grab iron.

"Don't let the happiness of your own home, that of some fellow-workmen, or that of a patron of the road, be marred by a careless act of yours. The mental agony of a person responsible for injury to another and who escapes to witness the suffering and worry of the unfortunate's dependent ones, is as much to be dreaded as personal injury resulting from such carelessness.

"Your job may not seem worth much to you, but it looks mighty good to the other fellow.

"There will soon be a next accident on the Road. Someone who reads this circular will be concerned as the responsible party or as an innocent sufferer. Do you want it to be you? If not, do your part to avoid it.

"The Safety First habit is first aid to the uninjured.

"The best book on the Safety First Movement, is the Book of Rules."

Canadian Rail Production in 1912.

The Bureau of Statistics of the American Iron & Steel Institute, Philadelphia, Pa., has published special statistical bulletin No. 9, giving the statistics of the production of steel ingots and castings and finished rolled forms of iron and steel in the Dominion of Canada in 1912; also statistics for the production of all kinds of pig iron in the first six months of 1913. In 1912 the output of rails amounted to 423,885 tons, or 49.2 per cent. of the total finished rolled production of iron and steel during the year. In 1911 the output of rails amounted to 360,547 tons, or 46.1 per cent. of the total finished rolled production during that year. The table below gives the production of all kinds of rails from 1895 to 1912. The total for 1899 includes 135 tons of iron rails. Steel rails only were rolled in all years other than 1899.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895	600	1901	891	1907	311,461
1896	600	1902	33,950	1908	268,692
1897	500	1903	1,243	1909	344,830
1898	600	1904	36,216	1910	366,465
1899	835	1905	178,885	1911	360,547
1900	700	1906	312,877	1912	423,885

Citizens' Committee to Finance Chicago Terminal Investigation.

A group of prominent Chicago business men has organized a "Citizens' Terminal Plan Committee" and has announced that it will finance to the extent of $100,000 a comprehensive study of the Chicago terminal problem, including various plans that have been suggested for new terminal locations. A statement issued by the committee outlines its purposes in part as follows:

"Although Chicago is the greatest railroad center in the world, there has never been a comprehensive study made by a duly qualified and authorized technical commission of its railroad passenger and freight terminal problem in its entirety. As this many sided problem is becoming more and more complicated, it seems to us imperative that such a study be made now, and by a commission of the ablest experts obtainable. We believe that such a broad investigation is needed to supplement the inquiry provided for by the present city council committee on railway terminals.

"We are not committed in favor of or against any of the various terminal plans which have been recently proposed and our only object is that this problem shall be thoroughly, broadly, and constructively investigated, with a view to reaching the best general solution."

As preliminary to the exhaustive investigation and report of the commission, Bion J. Arnold has been engaged to make a study of the terminal proposals of the Pennsylvania and its associated companies, and of various other terminal plans that have been advanced; likewise a study of the report, when made, of the city's expert, John F. Wallace, whose recommendations are expected to receive early attention in the city council. Mr. Arnold is to outline in a general way what should be the principles of an adequate and comprehensive railway terminal plan for the city as a whole; to report as to the extent to which such plans as may be recommended by Mr. Wallace would or would not fit into such a terminal plan for the city as a whole; to report what, if any, modifications of the plans recommended by Mr. Wallace should be made; and why; and to deal with any other matter in his discretion. He is also to report as to the field which should be covered in the comprehensive investigation by the commission of the railroad terminal problem of Chicago.

Halifax (N. S.) Ocean Terminals.

The new Halifax Ocean Terminals Railway which is being built to connect the existing main line of the Intercolonial with the proposed new ocean terminals to be constructed near the south end of the Halifax peninsula begins at Bedford basin and then passes under the Halifax & South Western Railway, thence in a southerly direction through the low divide between the basin and the North West Arm until it reaches Chebucto road, which will be crossed overhead. From Chebucto road the line follows the east side of the North West Arm in a southeasterly direction via Maplewood under and to the east of Young avenue. It then proceeds northeasterly crossing over Pleasant street to South and Fawson streets. From the west side of Quinpool road to the east side of Young avenue the railway is carried in a cutting, mostly through rock, and of sufficient depth to pass under all existing roads and streets with very slight alterations. Grade crossings have been entirely eliminated and the location of the railway along the North West arm and across the south end of the peninsula has been determined upon with the greatest care so as to preserve the natural beauty of these suburban and residential districts of the city.

A handsome Union passenger station will be situated near South and Pleasant streets on a site convenient alike to the harbor, business and residential centers of the city.

From Fawson street southward for a distance of about 1¼ miles along the western shore of Halifax harbor the ocean terminals will be constructed. They will provide for a bulkhead passenger landing quay 2,000 ft. long, and five piers each 1,250 ft. long, and 340 ft. broad, the whole protected at the southern end by a breakwater a quarter of a mile long. Ample railway tracks and connections, sheds and equipment, grain elevator, etc., will be provided for the handling of passengers and cargo, and a special feature of the terminals will be the exceptionally good facilities for the handling of passengers, mails and express freight. Extensive immigration quarters will be provided at the passenger landing quay. The quays will provide for depths ranging up to 45 ft., and will therefore be ample for the largest transatlantic liners afloat.

The contract for the grading of the Halifax Ocean Terminals Railway was awarded to the Cook Construction Company and Wheaton Brothers last June, and several of the steam shovels and the heavy plant have arrived, and the work is now proceeding. The railway will be double tracked throughout, and all culverts, bridges and structures will be of permanent construction. The maximum grade is 6/10 per cent., compensated for curvature and the sharpest curve 4 deg.

The contract for the grading includes the construction of a freight terminal yard on an area to be reclaimed from Bedford basin and will extend from Rockingham to Fairview. This contract also includes the construction of the breakwater. Both the terminal yard and breakwater will be constructed with materials excavated from the railway cuttings.

A passenger coach yard with all modern facilities will be provided immediately southwest of the passenger station.

The plans for the first unit of the ocean terminals are being prepared and tenders will be called for at an early date.

Halifax has a splendid geographical and strategical position. It possesses a magnificent, extensive and deep natural harbor perfectly protected, with a short, deep, well lighted and easily navigated entrance channel from the ocean, low range of tide, freedom from tidal currents and silting, and is open all the year round.

When the natural advantages of this harbor are supplemented by the proposed works, Halifax will possess terminal facilities which, although not the largest, will nevertheless equal if not surpass any on the Atlantic coast.

Indian Railway Tie Supply.

More than twenty-five per cent. of the surface of India is covered by so-called forests, but as much of this is mere scrub and a great deal is inaccessible, the railways, despite their relatively small mileage, are unable, under existing conditions, to obtain the whole of their wooden tie supply at reasonable rates in the country itself. The reasons for this state of affairs have been well known in India for many years past. To begin with, the native trees do not now yield an adequate supply of suitable timber, and the best local materials for railway work are so much in demand for other purposes that the price has become almost prohibitive in the majority of cases. In the damp climate of Bengal, Australian hardwoods, which have been imported in large quantities, have been found to produce good results, but the forestry service is concentrating its attention on the question of obtaining an adequate supply in the country. Attention is also being paid to the equally important matter of suitable treatment. Metallic ties, which have been extensively adopted, do not give good results on railways running through desert tracts of country, where sand-laden salty winds blow all the year round. Here wooden ties are a necessity. As in other countries, the shortage is due either to the thinning of the wooded areas as the result of unchecked and wasteful tree-felling, or to the absence of systematic reforesting. Timber supplies have been wasted, especially in native states, and trees large enough to cut into ties have become very scarce indeed, with the result that the railways of the country offer a good market for Australian and other hardwoods.

Car Inspectors' Convention.

The fourteenth annual convention of the Chief Interchange Car Inspectors' and Car Foremen's Association was held at Minneapolis, Minn., August 26-28, J. L. Stark presiding. The association was welcomed to the city by the mayor, Wallace G. Nye. Brief addresses were presented by J. L. Stark, T. H. Goodnow, assistant superintendent car department Chicago and North Western, and H. Boutel, chief interchange inspector at Cincinnati, Ohio. The discussions covered the interpretations of the M. C. B. rules of interchange very thoroughly and many points that have been somewhat misunderstood were cleared up, especially those concerning the changes made at the June convention of the M. C. B. Association this year.

The following is a list of the supply companies exhibiting at the convention:

American Steel Foundries, Chicago, Ill.—Models of the Economy draft arm, Vulcan cast steel brake beam, Vulcan truck, Simplex bolster, Davis wheel and Simplex coupler. Represented by H. J. Melchert and E. Wallers.

Emery Pneumatic Lubricator Company, St. Louis, Mo.—Brake cylinder lubricant. Represented by E. A. Emery.

Frost Paint and Manufacturing Company, Minneapolis, Minn.—Waterproof cements for car construction and paints for coal cars and underframes. Represented by S. E. Frost and A. B. Cross.

Grip Nut Company, Chicago, Ill. Represented by B. C. Hooper and T. P. Swan.

McCord & Company, Chicago, Ill.—Pinless lid journal box, continuous steel insert in journal box for resisting pedestal wear, locked lid journal box, draft gear swivel yoke, and the yokeless swivel connector draft gear with key attachment. Represented by W. J. Schlacks.

Mahr Manufacturing Company, Minneapolis, Minn.—The Mahr burner for steel car repairs. Represented by J. A. Mahr and H. H. Warner.

Standard Heat and Ventilation Company, New York.—Models of the thermo jet, unotherm, train line valve, steam hose coupler, hose clamps and exhaust ventilator. Represented by W. G. Hermeson.

Templeton, Kenly & Company, Chicago, Ill.—Simplex jacks. Represented by R. Goodell and A. E. Barron.

Central Railway Club.

The next regular meeting and fall outing of the Central Railway Club will be held at Buffalo, September 12. Members will go by boat to the Buffalo Launch Club on the Niagara river. The club meeting will be held immediately after arrival at that point. At this meeting J. C. Fritts, master car builder of the Delaware, Lackawanna & Western, will present a paper on Freight Car Troubles.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York. Annual meeting, October 14-15, Philadelphia, Pa.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 19, 1913, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-24, 1913, Montreal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 18-24, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.

Bridge and Building Supply Men's Association.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 West Broadway, Winona, Minn.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio.

Maintenance of Way & Master Painters' Association of the United States and Canada.—W. G. Wilson, Lehigh Valley, Easton, Pa.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.

Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago.

Master Car and Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.

National Railway Appliance Assoc.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

Northern Railroad Club.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

Railway Fire Protection Association.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Next meeting, October 7, Chicago.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.

Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Convention, October 14, Nashville, Tenn.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.

Railway Supply Manufacturers' Assoc.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

Railway Tel. and Tel. Appliance Assoc.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St .Louis.

Signal Appliance Association.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—C. Nyquist, La Salle St. Station, Chicago. Annual meeting, September 23-25, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

Toledo Transportation Club.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Utah Society of Engineers.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

The Maine Central announces that, beginning with September 1, 500-mile tickets will be sold in the State of Maine at $11.25, or 2¼ cents a mile.

The quarterly meeting of the Erie Railroad Freight Agents' Association was held at the Great Northern Hotel, Chicago, on August 21, with over 100 in attendance.

At Clayton, Del., the agent of the Adams Express Company has been arrested on a charge of violating the law of Delaware, forbidding the shipping of intoxicating liquors.

The New York, New Haven & Hartford expects to transport soon from southeastern Massachusetts about 1,500 carloads of cranberries. The cranberry farmers expect the largest crop on record.

A single shipment recently sent out from Youngstown, Ohio, destined to Newcastle, New South Wales, is reported to have filled 45 cars. It was material for a complete blast furnace, made by the Pollock Company.

The Union Pacific has announced that the American Express Company has been appointed passenger agent of the system in important cities of Europe. The American Express Company already represents in a somewhat similar capacity the New York Central Lines.

The Erie has extended its freight service in Chicago, both all-rail and lake-and-rail, to several stations on the Chicago River at Erie street, Market square, between Washington and Randolph streets, and Twenty-seventh and Robey streets, cars being taken to and from the new stations on car floats. A station at Webster avenue will be established later.

Through service between eastern and western Canada is now in effect over the Grand Trunk Railway system, in connection with the Northern Navigation Company, the route being westward over the Grand Trunk to Sarnia, the Northern Navigation Company to Fort William and the Grand Trunk Pacific to Winnipeg and points in western Canada. The summer schedule in effect over this route provides service three days a week in each direction.

The secretary of agriculture has issued a circular, No. 199, dated August 14, making changes, to take effect September 1, in the areas quarantined for Texas fever in cattle, considerable territories being released from quarantine in Texas, Oklahoma, Tennessee, Georgia and South Carolina. By the same order provision is made for transporting cattle to be exhibited at fairs in Alabama, Oklahoma, Mississippi, Virginia, Georgia, Arkansas and Texas.

The Ward Line, carrying freight to Gulf of Mexico points, announces that the suspension of through freight rates, ordered by the Mexican government some weeks ago, has been abrogated, and that shipments will now be made under tariff 3C, as formerly. It appears that the notice issued by the National Railways of Mexico, discontinuing through rates, was made necessary by an order of the authorities in Mexico, requiring freight rates to be quoted in Mexican currency, as well as to be printed in the Spanish language. The fluctuations in the value of Mexican currency made it impossible for lines in this country to adjust the tariffs as required by the order.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 149-A, giving a summary of car surpluses and shortages by groups from May 9, 1912, to August 15, 1913, says: The total surplus on August 15, 1913, was 69,253 cars; on August 1, 1913, 69,716 cars; and on August 15, 1912, 58,623 cars. Compared with the preceding period; there is a decrease in the total surplus of 463 cars, made up as follows: An increase of 3,083 in box, 163 in flat, and a decrease of 517 in coal, and 3,192 in miscellaneous car surplus. The increase in box car surplus is in groups 1 (New England lines), 4 (the Virginias and Carolinas), 5 (Kentucky, Tennessee, Mis-

sissippi, Alabama, Georgia and Florida), 6 (Iowa, Illinois, Wisconsin and Minnesota), 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas), 10 (Washington, Oregon, Idaho, California, Nevada and Arizona), and 11 (Canadian lines). The increase in flat car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and eastern Pennsylvania), 4 (as above), 7 (Montana, Wyoming, Nebraska and the Dakotas), 9 (Texas, Louisiana and New Mexico), 10 and 11 (as above). The decrease in coal car surplus is in all groups, except 2, 7 and 9 (as above). The decrease in miscellaneous car surplus is in all groups, except 2, 7 and 10 (as above).

The total shortage on August 15, 1913, was 14,828 cars; on August 1, 1913, 11,261 cars; and on August 15, 1912, 14,722 cars. Compared with the preceding period; there is an increase in the total shortage of 3,567 cars, of which 127 is in box, 414 in flat, 3,009 in coal and 17 in miscellaneous car shortage. The increase in box car shortage is in all groups, except 7, 8 and 9 (as above). The increase in flat car shortage is in groups 2 (as above), 3 (Ohio, Indiana, Michigan and western Pennsylvania), 4, 5 and 6 (as above). The increase in coal car shortage is in all groups, except 6 and 9 (as above). The increase in miscellaneous car shortage is in groups 1, 3, 5, 6, 10 and 11 (as above).

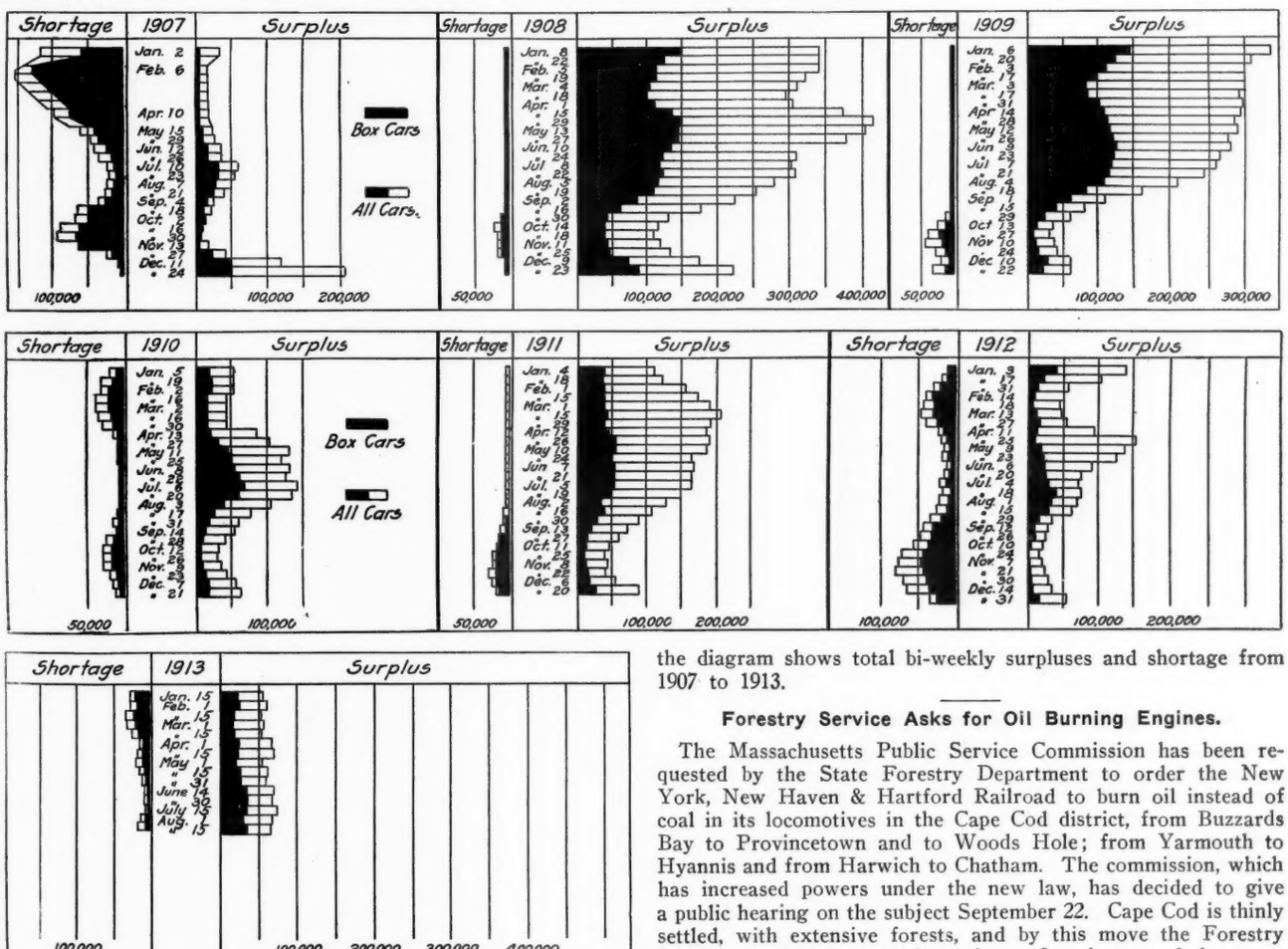
Compared with the same date of 1912; there is an increase in the total surplus of 10,630 cars, of which 8,197 is in box, 650 in flat, 3,148 in miscellaneous, and a decrease of 1,365 in coal car surplus. There is an increase in the total shortage of 106 cars, made up as follows: An increase of 2,335 in coal, and a decrease of 697 in box, 812 in flat and 720 in miscellaneous car shortage.

The accompanying table gives car surplus and shortages figures by groups for the last period covered in the report and

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—August 15, 1913	7	1,201	159	10	100	1,470	69	34	185	5	293
" 2.— " 15, 1913	33	505	78	1,789	834	3,206	165	3	693	0	861
" 3.— " 15, 1913	32	2,261	259	200	1,719	4,439	610	294	2,152	135	3,191
" 4.— " 15, 1913	16	3,845	692	674	447	5,658	704	422	2,490	0	3,616
" 5.— " 15, 1913	26	627	10	125	455	1,217	485	525	916	10	1,936
" 6.— " 15, 1913	31	8,436	147	1,345	3,839	13,767	1,265	32	126	9	1,432
" 7.— " 15, 1913	5	76	24	300	180	580	638	0	0	0	638
" 8.— " 15, 1913	20	3,210	86	1,833	3,466	8,595	417	88	339	17	861
" 9.— " 15, 1913	14	957	351	265	690	2,263	100	0	0	0	100
" 10.— " 15, 1913	21	3,883	928	1,752	8,869	15,432	384	1	137	117	639
" 11.— " 15, 1913	6	10,755	217	0	1,654	12,626	879	347	0	35	1,261
Total	211	35,756	2,951	8,293	22,253	69,253	5,716	1,746	7,038	328	14,828

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1913.

the diagram shows total bi-weekly surpluses and shortage from 1907 to 1913.

Forestry Service Asks for Oil Burning Engines.

The Massachusetts Public Service Commission has been requested by the State Forestry Department to order the New York, New Haven & Hartford Railroad to burn oil instead of coal in its locomotives in the Cape Cod district, from Buzzards Bay to Provincetown and to Woods Hole; from Yarmouth to Hyannis and from Harwich to Chatham. The commission, which has increased powers under the new law, has decided to give a public hearing on the subject September 22. Cape Cod is thinly settled, with extensive forests, and by this move the Forestry Department hopes to eliminate forest fires in one of the worst fire hazard districts of the state.

Revenues and Expenses of Large Roads for June.

The following figures were compiled by the Interstate Commerce Commission from monthly reports of operating revenues and expenses of large steam roads for the month of June, 1913, received up to August 22. No reports are included for roads whose operating revenues for the year ended June 30, 1912, did not reach $1,000,000. The figures are compiled as rendered and should not be considered final, inasmuch as scrutiny of the reports may lead to their modification before acceptance.

REVENUES AND EXPENSES OF LARGE STEAM ROADS.

Item.	United States. 1913.	United States. 1912.	Eastern District. 1913.	Eastern District. 1912.	Southern District. 1913.	Southern District. 1912.	Western District. 1913.	Western District. 1912.
Number of reports included...	159		62		32		65	
			MONTH OF JUNE.					
Average number of miles operated	204,449.98	202,260.26	52,008.61	51,681.02	39,087.50	38,958.25	113,353.87	111,620.99
Total operating revenues	$234,990,854	$219,631,031	$105,213,948	$99,134,288	$34,670,094	$32,691,347	$95,106,812	$87,805,395
Total operating expenses	165,237,401	149,197,388	75,336,571	66,176,078	25,506,495	23,726,954	64,394,335	59,294,355
Net operating revenue	69,753,453	70,433,643	29,877,377	32,958,210	9,163,599	8,964,393	30,712,477	28,511,040
Revenues per mile	1,149	1,086	2,023	1,918	887	839	839	787
Expenses per mile	808	738	1,449	1,280	653	609	568	531
Net revenue per mile	341	348	574	638	234	230	271	256
			TWELVE MONTHS ENDED JUNE 30.					
Average number of miles operated	203,695.68	200,986.39	51,853.16	51,538.81	39,060.56	38,748.57	112,781.96	110,699.01
Total operating revenues	$2,823,555,873	$2,548,782,711	$1,224,583,619	$1,102,126,326	$434,811,410	$403,284,513	$1,164,160,844	$1,043,371,872
Total operating expenses	1,950,334,155	1,755,940,392	874,159,449	774,160,864	311,608,713	286,409,876	764,565,993	695,369,652
Net operating revenue	873,221,718	792,842,319	350,424,170	327,965,462	123,202,697	116,874,637	399,594,851	348,002,220
Revenues per mile	13,861	12,681	23,616	21,384	11,132	10,408	10,322	9,425
Expenses per mile	9,575	8,737	16,858	15,021	7,978	7,392	6,779	6,281
Net revenue per mile	4,286	3,944	6,758	6,363	3,154	3,016	3,543	3,144

COMPARATIVE FIGURES BASED ON ALL ROADS HAVING REVENUES ABOVE $1,000,000 PER ANNUM REPORTING FOR JUNE, 1912.

For June—	1912.	1911.
Average number of miles operated	219,626.05	217,115.20
Revenues per mile	$1,078	$1,028
Expenses per mile	738	704
Net revenue per mile	340	324
For Twelve Months—		
Average number of miles operated	219,372.89	216,194.00
Revenues per mile	$12,601	$12,547
Expenses per mile	8,708	8,603
Net revenue per mile	3,893	3,944

Car Location.

The accompanying table, which was taken from bulletin No. 9 of the American Railway Association, gives a summary of freight car location by groups on August 1, 1913.

CAR LOCATION ON AUGUST 1, 1913.

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	89,899	679,355	281,468	201,442	168,910	481,064	17,252	153,154	29,704	131,765	137,316	2,371,329
Home Cars on Home Roads	46,864	402,362	114,890	105,544	87,946	336,850	5,772	83,538	14,519	77,588	95,446	1,371,319
Home Cars on Foreign Roads	43,035	276,993	166,578	95,898	80,964	144,214	11,480	69,616	15,185	54,177	41,870	1,000,010
Foreign Cars on Home Roads	46,920	284,764	207,587	74,373	62,519	179,419	8,954	70,457	23,667	51,399	44,113	1,054,172
Total Cars on Line	93,784	687,126	322,477	179,917	150,465	516,269	14,726	153,995	38,186	128,987	139,559	2,425,491
Excess or Deficiency	3,885	7,771	41,009	*21,525	*18,445	35,205	*2,526	841	8,482	*2,778	2,243	54,162
Surplus	1,484	9,182	1,263	4,232	1,208	12,192	473	9,583	2,240	15,320	12,539	69,716
Shortage	228	538	1,687	2,568	849	1,380	831	1,203	661	505	811	11,261
Shop Cars—												
Home Cars in Home Shops	6,125	40,342	22,369	13,469	15,164	25,687	672	11,316	2,469	5,322	4,572	147,507
Foreign Cars in Home Shops	1,274	8,858	7,747	2,186	1,986	4,727	525	2,154	847	2,366	488	33,158
Total Cars in Shops	7,399	49,200	30,116	15,655	17,150	30,414	1,197	13,470	3,316	7,688	5,060	180,665
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	52.13	59.23	40.88	52.39	52.07	70.02	33.46	54.55	48.88	58.88	69.51	57.83
Total Cars on Line	101.63	101.14	114.48	89.31	89.08	107.32	85.36	99.28	128.56	97.89	101.63	102.28
Home Cars in Home Shops	6.81	5.94	7.95	6.69	8.98	5.69	3.90	7.39	8.31	4.04	3.33	6.30
Foreign Cars in Home Shops	1.07	1.30	2.75	1.08	1.17	1.05	3.04	1.29	2.85	1.79	.35	1.42
Total Cars in Shops	7.88	7.24	10.70	7.77	10.15	6.74	6.94	8.68	11.16	5.83	3.68	7.72

*Denotes deficiency.

INTERSTATE COMMERCE COMMISSION.

The Houston Chamber of Commerce has filed a complaint with the Interstate Commerce Commission against 18 railways, attacking class and commodity rates from Houston, Tex., to points in Arkansas as unreasonable in comparison with rates from St. Louis, Kansas City and New Orleans to the same points.

Complaint Dismissed.

Boston Chamber of Commerce et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Prouty:

The complainants ask that rates from the Atlantic seaboard to Colorado and Utah common points be so adjusted that the through rate will be less than the combination upon Chicago or the Mississippi river. The commission decided that ordinarily the through rate is and should be less than the sums of the intermediates, for the reason that the cost of the through movement is less; and the present instance is no exception to this rule.

It is a fundamental maxim of rate making that the rate per ton-mile shall decrease as the distance increases, but it is not a rule of such universal or imperative application that every shipper is entitled to the benefit of it, nor can it be said that to disregard this rule creates of necessity a discrimination.

The complainants do not make out an undue discrimination, but they show rather an unnatural and an unreasonable rate condition. Balancing the effect upon the carriers by reduction in revenues which must ensue upon a removal of this complaint against the slight benefit which would accrue to complainants, the commission is of the opinion that no action should be taken now. (28 I. C. C., 230.)

STATE COMMISSIONS.

George P. Lawrence, a member of the recently established Public Service Commission of Massachusetts, has resigned.

The Public Service Commission of Missouri consists of the following gentlemen: John M. Atkinson (chairman), Wm. F. Woerner, John Kennish, Howard B. Shaw and Frank A. Wightman. The secretary of the commission is T. M. Bradbury; office at Jefferson City.

The Board of Public Utility Commissioners of New Jersey, acting on a complaint of a number of shippers; has forbidden an increase in freight rates which has been announced by the Morristown & Erie on shipments to points on the Delaware, Lackawanna & Western. The Morristown & Erie extends west from the western terminus of the Caldwell branch of the Erie Railroad, and connects with the Lackawanna at Morristown. The advance in rates was made in the shape of a notice discontinuing existing through rates, making necessary a combination of local rates for the shipments which are the subject of complaint.

Railway Officers.

Executive, Financial and Legal Officers.

H. A. Scandrett, interstate commerce attorney of the Union Pacific system, has moved his office from Omaha to Chicago.

Mrs. Cora B. Williams, of Atlanta, Ga., has been elected president of the Georgia, Florida & Alabama, succeeding her late husband, J. P. Williams, deceased.

James H. Hustis, vice-president of the Boston & Albany, has been elected vice-president of the New York, New Haven & Hartford, in charge of all departments, with headquarters at New Haven, Conn., effective September 1, and as soon as the by-laws of the company are amended so that Howard Elliott becomes chairman of the board, Mr. Hustis will succeed him as president of the New Haven. It is understood that this will take effect about November 1, as was noted in an article containing a portrait and sketch of Mr. Hustis in these columns on August 1, page 179.

George Theron Slade, who recently was elected first vice-president of the Northern Pacific, with office at St. Paul, Minn., was born July 22, 1871, in New York City. He was graduated from Yale University, class of 1893, and entered railway service that year with the Great Northern as a clerk. He was successively timekeeper and assistant roadmaster until August, 1895, when he was made chief clerk to the superintendent of the Eastern Railway of Minnesota. In September of the following year he was advanced to assistant superintendent and one year later was appointed superintendent of that road and the Duluth Terminal Railway. In November, 1899, he became general manager of the Erie & Wyoming Valley and the Delaware Valley & Kingston, which position he held until March, 1901, when he was made superintendent of the Wyoming and Jefferson divisions of the Erie. Five months later he was promoted to the general superintendency of the Erie division of that road, resigning April 1, 1903, to go to the Great Northern as general superintendent. Mr. Slade left the Great Northern in 1907 to accept the position of general manager of the Northern Pacific, and in 1910 he was chosen third vice-president of that road, and on August 27, he was elected first vice-president, as above noted.

Operating Officers.

W. J. Helmick has been appointed superintendent of the Gulf, Texas & Western, with headquarters at Jermyn, Tex.

P. G. Walton has resigned as assistant superintendent of the St. Louis, Brownsville & Mexico to go to the Pere Marquette.

W. S. Martin, assistant general manager of the Denver & Rio Grande, has been appointed general manager, with headquarters at Denver, Col.

E. O. McGrain, assistant general yardmaster of the Western Maryland, at Cumberland, Md., has been appointed general yardmaster of the Baltimore terminals, with headquarters at Hillen Station.

Frederick Hanssen, inspector of train service in the office of W. R. Scott, general manager of the Southern Pacific, has been appointed assistant superintendent of the Portland division at Portland, Ore.

M. C. Sullivan has been appointed assistant superintendent of the Texas & New Orleans and assistant division superintendent of the Galveston, Harrisburg & San Antonio, with headquarters at Houston, Tex., in place of W. Bretschneider, who has been granted a leave of absence.

R. E. Clarke, superintendent of car service of the Beaumont, Sour Lake & Western, the New Orleans, Texas & Mexico, Orange & Northwestern and St. Louis, Brownsville & Mexico, has been appointed superintendent of car service of those roads, with headquarters at Houston, Tex., and the former position is abolished.

The authority of J. W. Farrell, trainmaster of the Grand Trunk, has been extended to include the Third district, and the headquarters for trainmaster of Second and Third districts will hereafter be at Richmond, Que. T. Cushing, trainmaster at Richmond, has been assigned to other duties, and T. H. Mason has been appointed trainmaster of the Fourth district, succeeding A. D. McCarthy, resigned.

Maurice A. Neville, who recently was appointed general superintendent of the Cincinnati Northern, as previously stated in these columns, was born October 9, 1877, at London, Ohio. He was educated at the University of Notre Dame, Notre Dame, Ind., 1894 to 1899, and began railway work in June, 1899, with the Peoria & Eastern as engineer on corps. In October of that year he was made assistant engineer, and in March, 1901, was promoted to engineer maintenance of way. He was made superintendent in August, 1903, which position he held until his recent appointment as general superintendent of the Cincinnati Northern, with headquarters at Van Wert, Ohio, as above noted.

C. C. Walker, general superintendent of transportation of the Chesapeake & Ohio at Richmond, Va., has been appointed assistant to general manager, with office at Richmond. E. P. Goodwin, general inspector of transportation at Richmond, has been appointed superintendent of transportation, with office at Richmond. J. W. Knapp, general superintendent of the Virginia general division at Richmond, becomes superintendent of the Newport News terminals, with office at Newport News. J. P. Stevens, general superintendent of the Kentucky general division at Cincinnati, Ohio, has been appointed general superintendent of the Virginia general division, with office at Richmond. W. R. Hudson, general superintendent at Peru, Ind., has been appointed general superintendent of the Kentucky general division and the Chesapeake & Ohio of Indiana, with office at Covington, Ky. W. L. Booth, superintendent of the Ashland division, at Ashland, Ky., has been appointed superintendent of the Chesapeake & Ohio of Indiana, with office at Peru, Ind. H. H. Morris, superintendent of the Richmond division at Richmond, succeeds Mr. Booth, and E. I. Ford, superintendent of terminals at Newport News, succeeds Mr. Morris. Effective September 1.

Traffic Officers.

Zack J. Reese, baggage agent of the Texas & Pacific at Dallas, Tex., has been appointed general baggage agent of that system, with headquarters at Dallas.

Charles Elliott, city passenger agent of the Western Maryland at Baltimore, Md., has been appointed to the new position of general baggage agent, with headquarters at Baltimore. R. H. Lewis, formerly in the office of the division passenger agent of the Pennsylvania Railroad, at Baltimore, succeeds Mr. Elliott.

George C. Kelleher, chief rate clerk of the New Orleans & Northeastern, has been appointed assistant general passenger agent of the New Orleans & Northeastern, the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with headquarters at New Orleans, La., succeeding R. J. Anderson, resigned to go into other business.

Engineering and Rolling Stock Officers.

W. F. Howard has been appointed general foreman of the Gulf, Colorado & Santa Fe at Cleburne, Tex., succeeding A. B. Adams, promoted.

J. L. Taylor has been appointed assistant division engineer of the Pittsburgh, Cincinnati, Chicago & St. Louis, with office at Louisville, Ky., succeeding H. J. Shaw, transferred.

T. Keaveny has been appointed roadmaster of the Second district of the Oregon-Washington Railroad & Navigation Company, Fourth division, with headquarters at Colfax, Wash., succeeding J. L. Twyman, transferred.

G. M. Crownover, master mechanic of the Chicago Great Western at Oelwein, Iowa, has been appointed superintendent of motive power, with office at Oelwein, succeeding J. G. Neuffer, resigned to retire from railway service, effective September 1.

C. H. Sanderson, engineer of switchboard and power station design for the Westinghouse Electric Manufacturing Company at East Pittsburgh, Pa., has been appointed chief engineer of the Havana Electric Railway Light & Power Company, with headquarters at Havana, Cuba.

J. E. McQuillen, whose appointment as mechanical superintendent of the Gulf, Colorado & Santa Fe, with headquarters at Cleburne, Tex., has already been announced in these columns,

was born at Rochester, N. Y., January 25, 1873. He was educated in the public schools of Rochester and at the Sacred Heart Academy at Palestine, Tex., and began railway work in October, 1887, as roundhouse caller for the International & Great Northern at Palestine, being employed in that capacity until February, 1888, from which time until April, 1892, he was a machinist apprentice. He was then until October, 1895, machinist and foreman in various railroad and contract shops in the United States and Mexico, on the latter date being appointed general foreman of the Houston East & West Texas at Houston, Tex. From January, 1897, to June, 1901, he was a machinist and division foreman in the shops of the International & Great Northern at Taylor, Tex., and the following three months was with the Missouri, Kansas & Texas at Smithville, Tex., as a machinist. Mr. McQuillen went to the Gulf, Colorado & Santa Fe in September, 1901, and until December, 1902, was machinist and roundhouse gang boss at Temple, Tex. He was then made general foreman at Gainesville, Tex., and in November, 1906, was promoted to master mechanic at Silsbee, Tex., which position he held until his recent appointment as mechanical superintendent, as above noted.

Purchasing Officers.

Thomas Spratt, who has been appointed assistant purchasing agent of the Norfolk & Western, with headquarters at Roanoke, Va., as has been announced in these columns, was born on June 3, 1865, at Philadelphia, Pa., and was educated in the public schools of his native town. He began railway work on June 1, 1886, as clerk in the purchasing agent's office of the Norfolk & Western, and in June, 1901, was made stationer. In September, 1903, he became chief clerk to the purchasing agent, which position he held at the time of his recent appointment as assistant purchasing agent of the same road, as above noted.

George Edwin McWhite, whose appointment as assistant purchasing agent of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., has been announced in these columns, was born on March 8, 1885, and was educated in the high schools. He began railway work on July 11, 1905, in the enginering department of the Atlantic Coast Line, and left that company the following January to go in the purchasing department of the Atlanta, Birmingham & Atlantic. He has been in the continuous service of that road ever since, and was chief clerk of the purchasing department at the time of his recent appointment as assistant purchasing agent.

OBITUARY.

Herman Silver, formerly receiver of the Los Angeles & Pacific, died on August 19 at Los Angeles, Cal., aged 82 years.

George L. Irwin, formerly a division superintendent of the Chicago & North Western, died on August 22 at his residence in Chicago, aged 83 years.

George W. Crary, treasurer of the New Orleans, Mobile & Chicago, at Mobile, Ala., died in that city recently. Mr. Crary was born in Cincinnati, Ohio. He was secretary and treasurer of the Mobile, Jackson & Kansas City, and when that company was reorganized under the name of the New Orleans, Mobile & Chicago in 1909, he retained the same position; but since January, 1912, he has been treasurer only.

William Carpenter Smith, chief engineer maintenance of way of the Northern Pacific at St. Paul, Minn., died in that city on August 26. He was born on July 30, 1865, at St. Cloud, Minn., and graduated from the civil engineering department of the Minnesota State University in June, 1890. The same year he began railway work as resident engineer on the St. Paul & Northern Pacific, and three years later he was appointed assistant engineer at Duluth, Minn., of its successor, the Northern Pacific, and has been in the continuous service of that road ever since. He was transferred in 1897 in the same capacity to Jamestown, N. D., and from 1899, to March, 1902, was assistant engineer in charge of construction work. In March, 1902, he was appointed division engineer at Livingston, Mont., and the following December was transferred in the same capacity to St. Paul, Minn., remaining in that position until March, 1907, when he was made engineer maintenance of way, and since February 7, 1910, was chief engineer maintenance of way of the same road.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Korean Government Railways have ordered 6 Pacific type locomotives from the Baldwin Locomotive Works.

The Czarnikow Rionda Company, New York, has ordered 1 consolidation locomotive from the Baldwin Locomotive Works.

The Brazil Northeastern has ordered 4 ten-wheel locomotives and 3 consolidation locomotives from the Baldwin Locomotive Works.

The Wisconsin & Northern has ordered 1 ten-wheel locomotive from the American Locomotive Company. The dimensions of the cylinders will be 19½ x 26 in., the diameter of the driving wheels will be 63 in., and the total weight in working order will be 165,000 lbs.

IRON AND STEEL.

The Northern Pacific is in the market for 3,400 tons of structural steel.

The New York Central Lines will soon be in the market for about 125,000 tons of rails.

The Chicago & Alton has ordered 2,000 tons of structural steel from the American Bridge Company.

General Conditions in Steel.—During the past week there has been an improvement in buying movement. The demand for the lighter products is more pronounced than for the heavier grades of steel. The month of September is expected to mark the beginning of a considerable improvement in the buying movement on the part of the railroads. A number of roads are now figuring on heavy rail orders for 1914 requirements, and it is expected that some of these orders will be placed in the near future. Steel manufacturers also believe that orders for rolling stock will show material increases during the next few months.

Indian Railway Improvements.—Some modest schemes are in contemplation for the improvement of communications within the native states of Jodhpur and Bikanir. The idea seems to be to convert that portion of the Jodhpur-Bikanir Railway which lies between Kuchwan Road and Hyderabad to broad gage, with certain additions on 3 ft. 3 in. gage as feeders.

New South Wales Engine Order.—The Government of New South Wales has placed orders for 80 new locomotives for the State railways. The North British Locomotive Company, Ltd., of Glasgow, Scotland, is to supply 50 and the Manchester, England, firm of Beyer, Peacock & Company, Ltd., the remaining 30. The former must deliver within five months, ready for shipment at Glasgow, four engines, and thereafter six each month until the order is filled. The latter will supply two engines within nine months, four each succeeding month. The prices to be paid are about $34,000 and $27,500, respectively, for the Glasgow and Manchester engines.

Railway Construction in India.—The Nizam's Guaranteed Railways Company have some extensions in contemplation. The idea is to get 3 ft. 3 in. gage communication with Gadag Junction on the Madras & Southern Maharatta system, whence there is a direct run to the port of Marmagoa. The lines to be built are one from Secunderabad southwards through Mahabubnagar to the Kistna, and then westwards to Raichore; and another from Raichore to Hutti; and a third from Hutti to Gadag. In this way a good deal of country will be opened up and traffic will be collected for Marmagoa. That port will be nearer than Bombay to many parts of the Hyderabad State, and the advantage thus gained should stimulate trade. Surveys are now being made, and when the estimates of cost have been framed capital will be raised to carry out the project. The company has now only 792 miles of open line, of which 441 are on the 3 ft. 3 in. gage, and there is ample scope for raising the mileage to over one thousand.

Supply Trade News.

The Church-Davidson Company, Chicago, has been appointed general time inspector for the Chicago, Peoria & St. Louis.

The Maloney Oil & Manufacturing Company, Scranton, Pa., has opened an office in the Karpen building, Chicago. This company makes a specialty of high grade oil for signal lamps.

The Mid-Western Car Supply Company, Chicago, which was declared bankrupt on May 20, 1913, has filed an application for the discharge of its debts. A hearing will be held in Chicago on October 6.

A. L. Whipple has resigned his position as vice-president of the Standard Heat & Ventilation Company, New York, with office in Chicago, to enter the railway supply business on his own responsibility.

M. F. Ryan, who has been connected with the Pittsburgh Spring & Steel Company, Pittsburgh, Pa., for the past ten years, has been appointed general western sales agent of that company, with office in Chicago, in place of L. C. Noble, deceased.

W. H. Hooper, assistant to the president of the Chicago Car Heating Company, with office in Chicago, has resigned to become a vice-president of the Standard Heat & Ventilation Company, New York, with headquarters in the Peoples Gas building, Chicago.

C. H. Sanderson, engineer of switchboard and power station design for the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., with office at East Pittsburgh, has resigned that position to become chief engineer of the Havana Electric Railway, Light & Power Company, with office at Havana, Cuba.

R. A. Paterson, formerly eastern manager of the C. F. Massey Co., Chicago, resigned from that concern on August 1, to become associated with Thomas A. Edison, as vice-president and manager of sales of the Edison Concrete Products Company, with sales offices in New York, Philadelphia and Boston. Mr. Paterson's headquarters will be in the St. James building, New York.

The American Locomotive Company, New York, has decided to discontinue the manufacture and sale of Alco automobiles and motor trucks. The automobile department, since its start in 1905, has been unprofitable to the company, and the prospects for the future of carrying on the business successfully are so uncertain as not to warrant, in the judgment of the directors, the continuance in this field of industry. The company will continue to make repair parts for its automobiles for a period of not less than five years.

TRADE PUBLICATIONS.

REINFORCING BARS.—The Interstate Iron and Steel Company, Chicago, has issued an illustrated booklet on its rail carbon steel, plain and twisted reinforcing bars, including specifications and a number of illustrations of structures on which these bars have been used.

GREAT NORTHERN.—The passenger department has issued a folder describing short trips in Glacier National Park, and giving detailed directions and cost estimates for various kinds of tours within the park. The company has also issued a folder on vacation resorts in the northwest.

RAIL ANTI-CREEPERS.—The P. & M Company, Chicago, has issued a booklet entitled Interesting Installations of P & M Rail Anti-Creepers, which contains a large number of excellent half tone illustrations from photographs of tracks on which the Anti-Creeper has been installed since they were first put in service in 1907.

ELECTRIC STEEL.—The Illinois Steel Company, Chicago, has issued a small pamphlet describing the advantages of electric steel. This steel compares favorably in quality with crucible steel but can be made in larger quantities, therefore cheaper. This steel is especially adaptable for axles, side rods, piston rods, crank pins and tires.

Railway Construction.

ARIZONA ROADS.—The Calumet & Arizona Mining Company is planning to build a railroad, it is said, from Tucson, Ariz., west to its mines in the Ajo district, about 85 miles. Surveys will soon be started under the direction of R. H. Jones.

BRIDGEPORT & SOUTHERN.—Incorporated in Illinois with $25,000 capital and office at Bridgeport. The plans call for building from Bridgeport, in Lawrence County, Ill., south through Lawrence and Wabash counties to Mt. Carmel, 30 miles. The incorporators include John P. Klein and A. A. Pantelis, Chicago; T. S. Hogan and George B. Erb, Bridgeport.

DENVER & SALT LAKE.—An officer writes that track laying has just been started on the extension from Steamboat Springs, Colo., west via Hayden to Craig, 41 miles. M. A. Wogan was the general contractor for the grading work, and McCabe & Stein are doing the track laying. There will be two 70 ft. through girder bridges on the line. (August 8, p. 253.)

We are told that a contract will be entered into in about two weeks between the city officers of Denver, Colo., and the Denver & Salt Lake for the construction of the Moffatt tunnel under James Peak, which is to be about six miles long. It is expected that the work will be started within three or four months.

HIAWASSEE VALLEY.—The contract has been let, it is said, to build from Andrews, N. C., on the Southern Railway southwest via Marble to Peach Tree, thence southeast via Hayesville to Hiawassee, Ga., 35 miles. J. Q. Barker, president, and W. C. Sanderlin, chief engineer, Andrews. (June 20, p. 1592.)

HOUSTON & TEXAS CENTRAL.—A franchise has been granted this company, it is said, to build from Eureka, Tex., to Pierce Junction. The work is to be started at once and pushed to completion. The new line is to be built to carry through freight around Houston, and will reduce the congested condition of the Houston freight yards.

INTERCOLONIAL.—Bids are wanted until September 8, it is said, for double-tracking work between St. Romuald, Que., and Chaudiere Curve. L. K. Jones is assistant deputy minister and secretary of the Department of Railways and Canals, at Ottawa, Ont.

See an item in General News regarding the construction of a new connecting line, also of terminal improvements at Halifax, N. S.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, on August 19, opened bids for the construction of Section No. 1 of Routes Nos. 36 and 37, known as the Woodside, Astoria & Corona Rapid Transit Railroad. The Snare & Triest Company, New York City, submitted the lowest of ten bids, their bid aggregating $884,859. The Astoria, Woodside & Corona line, now partly under construction in Queens borough, begins at the Queens plaza of the Queensboro Bridge and runs respectively through Second avenue to Ditmars avenue, Astoria, and through Queens boulevard and Roosevelt avenue to Sycamore avenue, Corona. Both are to be elevated railroads, and are to be operated jointly by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation. Section No. 1 covers the junction point of the two lines and the joint station near the Queensboro bridge. Contracts for the Astoria line, Section No. 2, and the Corona line, Section No. 3, were let several months ago, and construction work is now in progress. The contractors for the Astoria line are Cooper & Evans, and for the Corona line, the E. E. Smith Contracting Company, both of New York City. It is expected that a contract with the Snare & Triest Company for the construction of Section No. 1 will be executed within a short time, and the contractors will be required to begin work within 60 days after that date.

NORTHPORT & SOUTHWESTERN.—We are told that contracts will not be let until after January 1, 1914, to build from Northport, Neb., in a general southwest direction via Reddington, Harrisburg, Albin, Wyo., Pinebluff, Grover, Colo., and Greeley to Denver, about 200 miles. There will be five steel bridges, one 1,700 ft. bridge over Platte river, and four to have an average length of 30 ft. The company expects to develop a traffic in grain, sugar beets, livestock, creamery products, merchandise, etc.

C. F. Perry and B. W. Marshall, Pinebluff, Wyo., are promoters, and D. W. Trick is chief engineer.

Oklahoma Roads.—Application has been made in Oklahoma for a charter to build from the northern boundary of the state in Nowata county southwest through the counties of Nowata, Rogers, Washington, Osage, Tulsa, Creek, Okmulgee, Okfuskee, Lincoln, Seminole, Pottawatomie, Cleveland, McClain, Garvin, Stephens, Carter, Jefferson and Love, about 300 miles. W. E. Hawley and C. L. Huonker, of Tulsa; W. J. Cornes and Edward S. Edge, of Cleveland, O., and J. H. Cleveland, of Skiatook, are interested.

Pennsylvania Southern.—An officer writes that work is now under way, rebuilding the line from Sumerville, Pa., to Clarion, 16 miles. There will be a 120-ft. bridge on the line, and the company has given a contract to J. C. Trunk, Clarion, for rehabilitating the concrete engine house at Clarion, at a cost of $6,000.

St. John & Quebec.—Construction work on the St. John valley line north of Centreville, N. B., and south of Gagetown is expected to be started during September. The company's plans call for building from St. John, N. B., northwest, following the St. John river to Grand Falls, 210 miles. It is understood that a tentative arrangement has been made with McFarlane & McDonald to build the section from Centreville to Andover, although no contract has been formally closed. The route north of Centreville has not yet been formally approved by the Minister of railways, but has been approved south of Gagetown to the King's county line. The construction work south of Gagetown will be carried out by J. H. Corbett & Sons Company, Inc., whose original contract was for building from Fredericton to Rothesay. The Corbett company has track laid on more than 25 miles south of Fredericton towards Gagetown. A. R. Gould, president, Presque Isle, Maine; R. Thompson, chief engineer, Fredericton, N. B. (June 7, 1912, p. 1263.)

Temple, Northwestern & Gulf.—The Railroad Commission of Texas has been advised that construction work on this line was recently resumed. The grade between Temple and Gatesville, with the exception of about one mile, was finished some time ago and four miles of track were laid. The plans call for building from Temple, northwest via Gatesville, Hamilton and Comanche. (February 28, p. 412.)

Texas Roads.—Plans are being made, it is said, to build a line from Terrell, Tex., southeast via Willis Point, Myrtle Springs, Canton, and Ben Wheeler to Tyler, about 80 miles. W. M. Raley, M. C. Roberts and T. P. Davis, of Terrell; J. H. Vinson, Myrtle Springs; D. S. McPhail, Canton, and O. O. Morris, Ben Wheeler, are interested.

RAILWAY STRUCTURES.

Auburn, Pa.—An officer of the Philadelphia & Reading writes that a contract has been given to the James McGraw Co., Philadelphia, Pa., for the foundation work on two reinforced concrete slab bridges to be built over the Schuylkill river. Each bridge is to have 11 spans of 20 ft. each.

Clarion, Pa.—See Pennsylvania Southern under railway construction.

Halifax, N. S.—See an item in General News regarding terminal improvements at Halifax.

Ogden, Utah.—The Denver & Rio Grande has received bids for a steel, brick and concrete freight house at this point.

Schuylkill Haven, Pa.—Bids have been received by the Philadelphia & Reading for a one-story freight house, 18 ft. x 264 ft. 5 in., to be of steel frame construction with brick end walls, and for a two-story brick office building, 18 ft. x 40 ft., to be built on Railroad avenue, Schuylkill Haven. The cost of the buildings will be about $30,000.

Silsbee, Tex.—The Gulf, Colorado & Santa Fe has let a contract to W. D. McCoy of Cleburne, Tex., for an 8-stall addition to its engine house at this point.

Spartanburg, S. C.—The South Carolina Power, Light & Railway Company, it is said, will build a machine shop, carpenter shop and a paint shop at Spartanburg. It is understood that the company will also enlarge its car barns.

Railway Financial News

Chicago, Milwaukee & St. Paul.—In listing on the New York Stock Exchange the $30,000,000 general mortgage 4½ per cent. bonds sold a few months ago, the company stated that the proceeds of the sale were to be used as follows: $10,648,000 to refund an equal amount of underlying bonds matured previously; $13,358,371 for betterments and improvements, for Chicago terminals, new docks at Milwaukee and Racine, and other additional facilities; $134,243 for real estate, and $5,859,686 for new equipment.

Cleveland, Cincinnati, Chicago & St. Louis.—This company has asked the Ohio Public Service Commission for permission to issue $758,000 general mortgage 4 per cent. bonds and sell them at 78.

At the directors' meeting on August 26 the regular quarterly dividend of 1¼ per cent. on the preferred stock was passed. Dividends at the rate of 5 per cent. yearly have been paid on the preferred stock since 1899. The last dividend on the common stock was 2 per cent., paid in 1910.

Colorado, Kansas & Oklahoma.—*The Commercial & Financial Chronicle* quotes an officer as saying that this company bought at foreclosure sale on August 6 the property of the Scott City Northern, which road ran from Scott City, Kan., to Winona, about 52 miles.

Denver & Salt Lake.—This company, which is the successor of the Denver, Northwestern & Pacific, has terminated its lease of the Northwestern Terminal in Denver and withdrawn its guarantee from the $2,025,000 Northwestern Terminal 5 per cent. bonds. The Denver, Laramie & Northwestern also uses the Northwestern Terminal property.

Louisiana & North West.—On application of the Baldwin Locomotive Works, Judge Foster, of the United States district court at New Orleans, has appointed George W. Hunter receiver. The Louisiana & North West runs from McNeil, Ark., to Natchitoches, La., 121 miles.

New Orleans, Mobile & Chicago.—A suit has been filed in the New York supreme court by Stanley Hess, as assignee of Kuhn, Loeb & Co., for $219,583, balance with interest due on two loans aggregating $633,000.

New York, New Haven & Hartford.—Stockholders, at a special meeting on August 22, voted to issue $67,552,400 convertible debenture 6 per cent. bonds, and voted to approve the net increase in the authorized capital stock to provide for the conversion of these bonds at par. The bonds are to be convertible at par from 1918 to 1928. They are dated October 1, 1913-1933. The debentures are to be offered to stockholders at par, and the company is to receive 97½, the underwriting syndicate, headed by J. P. Morgan & Co., to receive 2½ per cent. The proceeds from the sale of these debentures will provide for indebtedness amounting to $40,000,000, maturing December 1, 1913, and $5,000,000 maturing February 1, 1914, and will provide for the additional capital required to complete the electrification between Stamford and New York, buy new steel equipment, etc.

The directors, at a meeting subsequent to the stockholders' meeting, elected W. Murray Crane, of Dalton, Mass., a director, succeeding D. H. Warner, of Bridgeport, Conn., resigned, and elected Theodore N. Vail a member of the executive committee.

Northwestern Terminal.—See Denver & Salt Lake.

Pittsburgh, Cincinnati, Chicago & St. Louis.—This company has sold to Kuhn, Loeb & Company and Speyer & Company, both of New York, $7,000,000 consolidated mortgage 4½ per cent. series I bonds. The total authorized issue of consolidated mortgage bonds is $75,000,000, of which, including the present bonds, there are outstanding $67,078,000 issued at various rates of interest, the last previous issue being made in 1910 at 4 per cent. Each series runs for 50 years. The proceeds from the sale will be used to retire $3,000,000 Steubenville & Indiana 5 per cent. bonds, due January 1, 1914. After that date there will be outstanding $2,130,000 bonds only that are senior to the consolidated bonds.